AUGUST 20, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

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SKILLED LABOR...

How to Win and Hold It

— page 42

DIE CASTERS HOLD THEIR OWN
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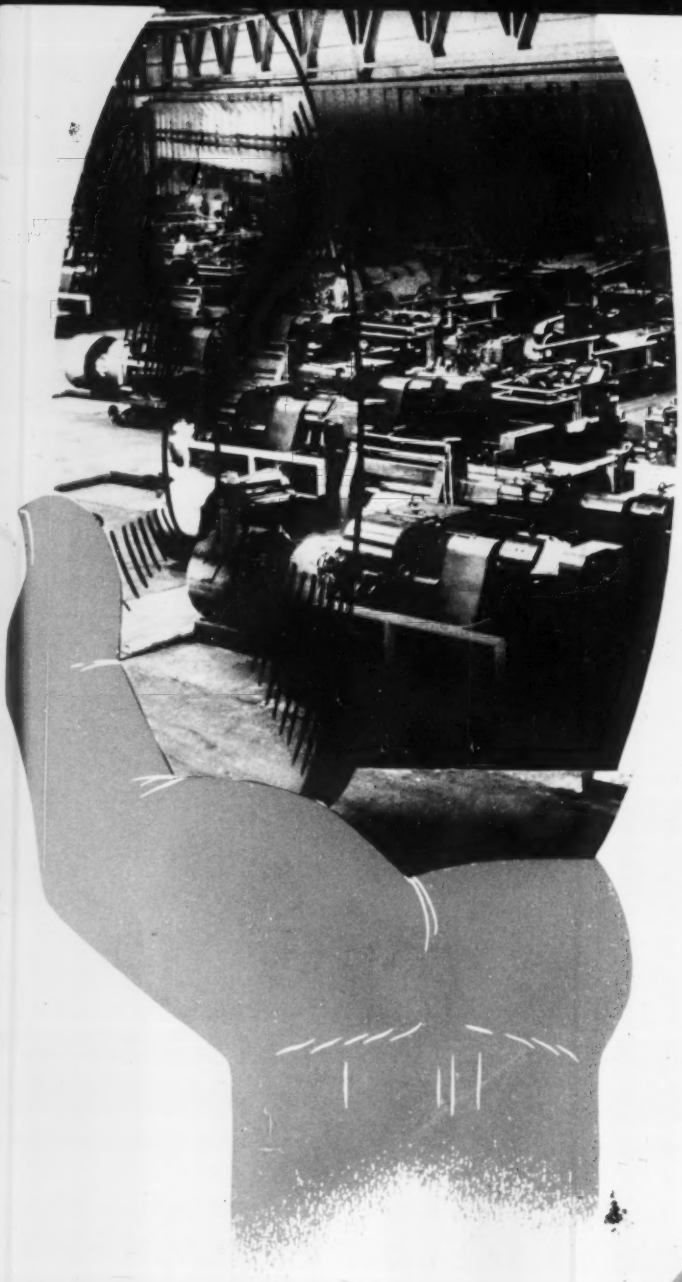
—try straight chrome type 430, p. 66



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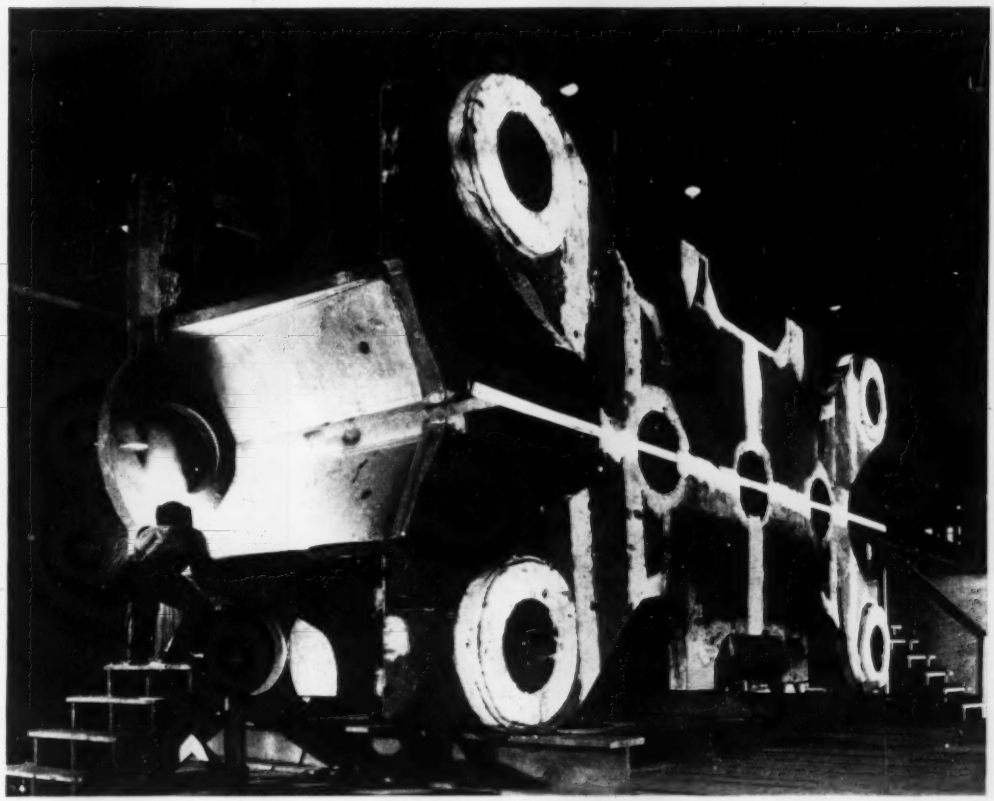

Crown for 8000-ton Hydraulic Press Made by Welding

Shown resting on its side, this Bethlehem Weldment is the crown for an 8000-ton triple-action hydraulic press for the aircraft industry. The crown consists of rolled steel plates and castings, approximately 6 in. thick, and welded together. It is 12 ft wide, 29 ft long, and 9 ft, 7 in., high. It weighs 168 tons.

Bethlehem Weldments are ideal for either large or small machinery parts because of their strength, durability, and economy. They can be produced as simple parts or intricate assemblies, in practically any size. They eliminate excess weight without sacrificing rigidity. They permit freedom of design, for the steel can be bent, pressed, or otherwise shaped prior to welding, without damage to the physical structure of the steel. They can also be used in combination with steel castings or forgings.

Before planning parts for new machinery, investigate the advantages of Bethlehem Weldments. Get in touch with the nearest Bethlehem sales office, stating the type of machine you have in mind.

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BETHLEHEM STEEL

BETHLEHEM WELDMENTS

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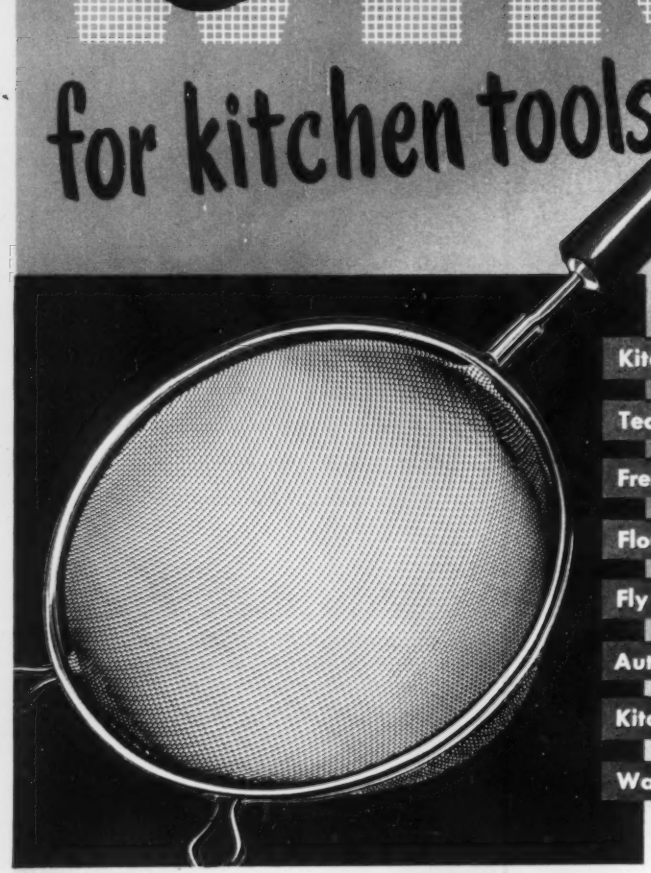

- Kitchen Strainers
- Tea Strainers
- French Fry Baskets
- Flour Sifters
- Fly Swatters
- Automatic Dishwasher Baskets
- Kitchen Range Air Filters
- Water Faucet Filters

If you use wire cloth—whether it's for dishwashers or diesels . . . automobiles or aircraft . . . flour sifters or floor furnaces . . . french fryers or farm tractors—1-inch to 120-mesh—consult Reynolds Engineers.

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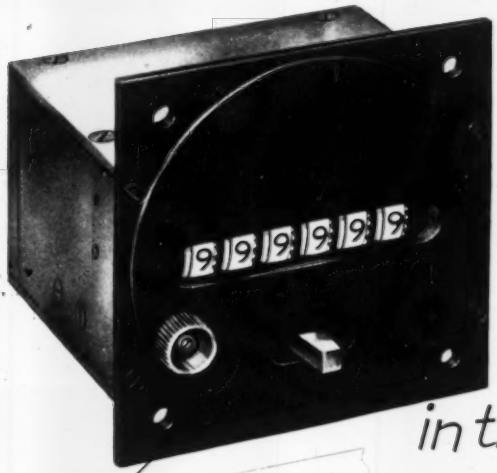

...and here's a Counter that talks to Jet-Testers in their own language...

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STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 8 AUGUST 20, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 152. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week ... **Research Management Needs More Men ... Research Pushed on Gas Turbine Blade Materials ... Machine Tools Self-Controlled by Air-Electric Gage System ... Analyzer Controls Gas Cleaning Equipment at Blast Furnaces**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

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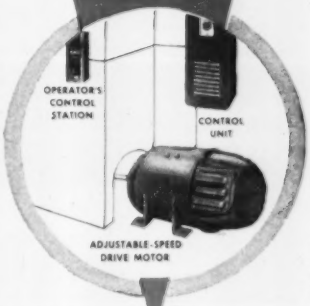

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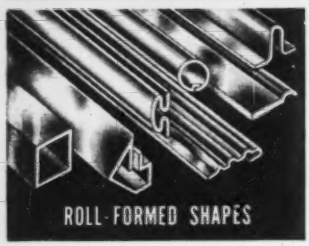

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Behind the Scenes...

A Trend

The editors aren't the only ones that spot trends. We've just put our finger, or rather our foot, on one of terrific import.

National Production Authority has just revoked M-34, which restricted sole leather cutting. Sole leather may now be cut up without the slightest direction from the government. Could that be a trend, a sign that the government is pulling out of the control business?

Psalm of the Socialist

In a publication called the *New York Sales Executive Weekly* appeared this "Psalm of the Socialist": The government is my shepherd. I need not work. It allows me to lie down on good jobs. It leadeth me beside the still workers. It destroyeth my initiative. It leadeth me in the paths of politics for survival's sake. Yea, though I walk through the valley of the shadow of debt, I will fear no weevil. For the government is ahead of me. Its doles and its subsidies, they worry me. It prepareth a table for me in the presence of my incredulity. It anointeth my head with banana oil. My rights are run over. Surely ignorance and bureaucracy shall follow me all the days of my life and I shall dwell in a state of confusion forever."

Clay Days

Tread lightly for you are about to embark on National Clay Week, scheduled for Aug. 22-25 inclusive. The theme is "Make It Clay All the Way."

We should not speak lightly because clay is an important raw material, used in the manufacture of clay pipe, brick, tile, refractories, pottery and china. We are informed that the center of the clay industry is around Uhrichsville, O., in Tuscarawas county, where clay products have been manufactured since 1833.

Lightning Strikes

We can now report what it feels like to be struck by lightning. We were sitting in our living room the other evening reading STEEL. A thunder storm had started, and we had just returned from a trip around the house closing all windows and doors. Suddenly we leaped about a foot at the sound of a deafening crash. We ran upstairs to the attic, found a hole in the roof about the size of a half-dollar next to the chimney, but no other sign of damage. The next day we discovered that the lightning had struck our chimney, jarred a piece of a shingle loose and then run down a downspout by the chimney to the ground.

Discourse on Licenses

In at least three states — Kentucky, Ohio and Montana—automobilists won't have to put on metal license plates for 1952. Stickers or decalcomania licenses will be affixed to the windshields and the 1951 metal plates will remain on the vehicle. On trailers, motorcycles and other vehicles which have no windshields, the new decalcomania licenses will be superimposed on the 1951 plates.

Palm Brothers Decalcomania Co., Cincinnati, the source for our information, reports that the new licenses will be the top copy of a snap-out form.

About 25,000 tons of steel are used each year on state license plates. Palm Brothers is looking forward to plenty of activity in the license decalcomania business while the steel shortage lasts.

Puzzle Corner

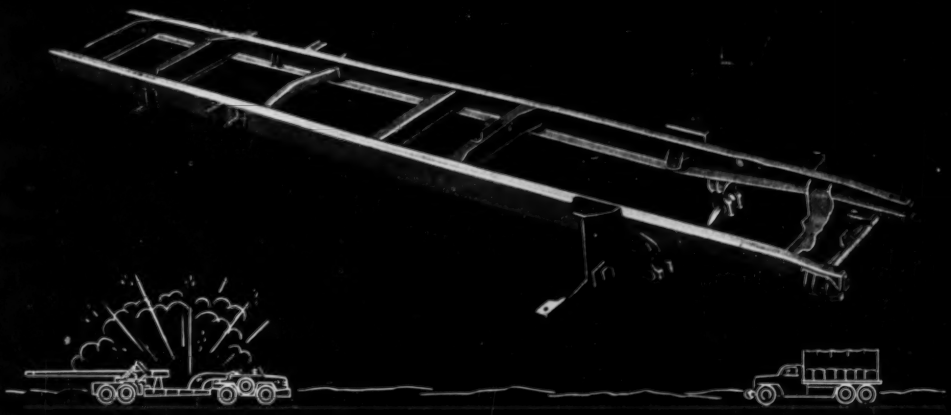
The subway train schedule that brought the merchant in the Aug. 6 puzzle downtown 80 per cent of the time, despite the fact that just as many trains run uptown, is this: Downtown schedule, on the hour and at 5 minute intervals thereafter; uptown schedule, 1 minute after the hour, 6 minutes, 11 minutes, 16 minutes and so on. He can catch an uptown train in only 1 minute out of each 5, but is exposed to a downtown train for 4 minutes out of each 5. That one was a toughie and brought in unusually few responses. First in with the correct answer were Robert W. Huff of Canton, O. and Fred Fortman of National Metal Fabricators.

The rubber in an inner tube weighs 3 pounds. Assume that the inner and outer peripheries of the tube are circles, that a right section of the tube is a circle, that the rubber wall is of uniform thickness and that the specific gravity of the tube is 1.2. If the diameter of the inner periphery is 16.5 inches and the diameter of the tube (measured from the outside surface) is 5.25 inches, find the thickness of the rubber wall of the tube.

Shrdlu

(Metalworking Outlook—Page 29)

Backbone for a Workhorse....



SHARON* HI-TENSILE STEEL INCREASES PAY LOAD OF MILITARY TRUCKS AND BUSES

Pay Load is the big word for both military and civilian vehicles. There's just one reason for the current shift to high tensile - low alloy steel frames for military trucks and buses.

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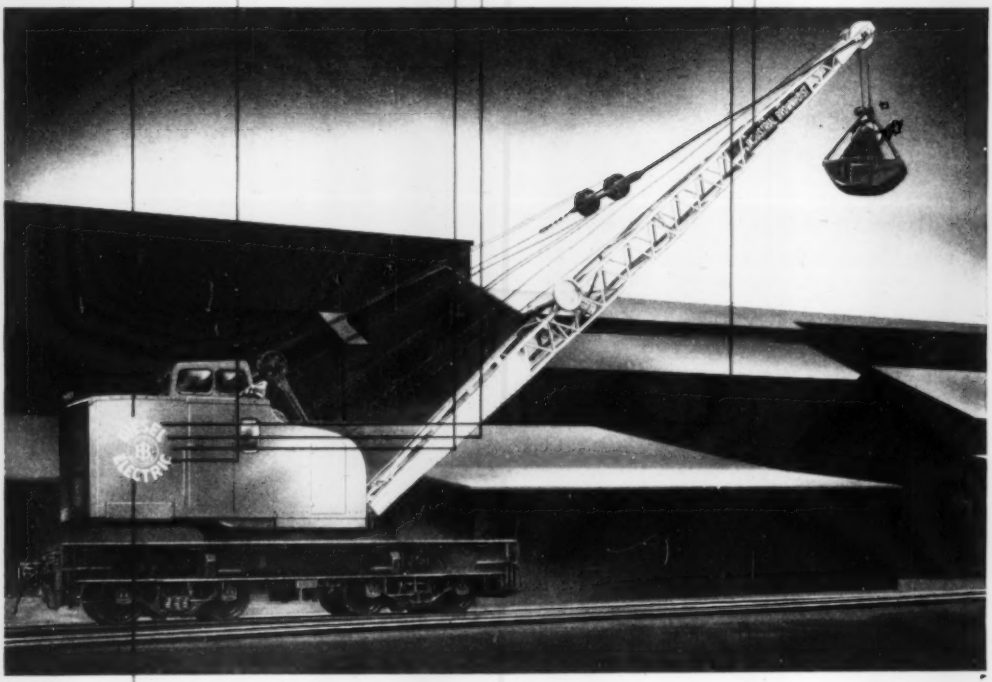
NEW CLEAR-VISION BOOM provides maximum vision for greater working efficiency. This open type boom in conjunction with the Brownhoist patented Monitor-type cab guarantees 360° visibility.



and these optional features—8 wheel chain drive for increased drawbar pull. Twin engine drive for work on extreme grades or where greater tractive effort is required. Timken roller bearing journals for low starting tractive effort. For complete description write to . . .

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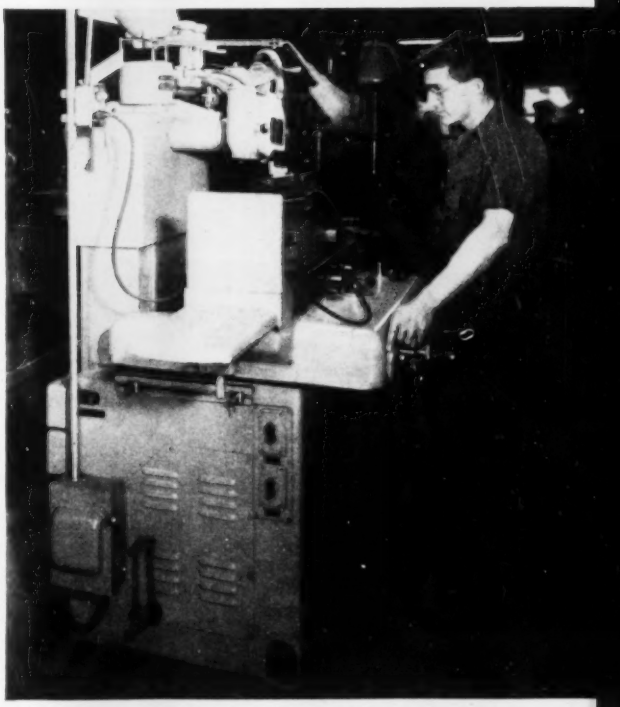

TAKE a tip from Biddle Screw Products, Sheridan, Indiana. The carbide bar in one of their large screw machines would warp under normal cutting conditions. The cut was taking ¾ of a day and the piece wasn't always satisfactory.

Then they turned to DoALL "Cool-Grinding" of the carbide bar. The coolant *flows through* the wheel and atomizes at the point of work. *Standard wheels are used.*

RESULTS? No warping, a straight cut, perfect pieces — *and only 30 minutes to do the job!*

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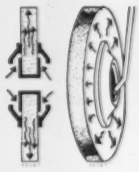

Coolant is metered into the hub of the wheel, forced centrifugally through the pores and out in a fine mist *at the point of contact of wheel and work.* No other system can do this. No other system gives such fast, smooth, accurate results with no burning or checking.

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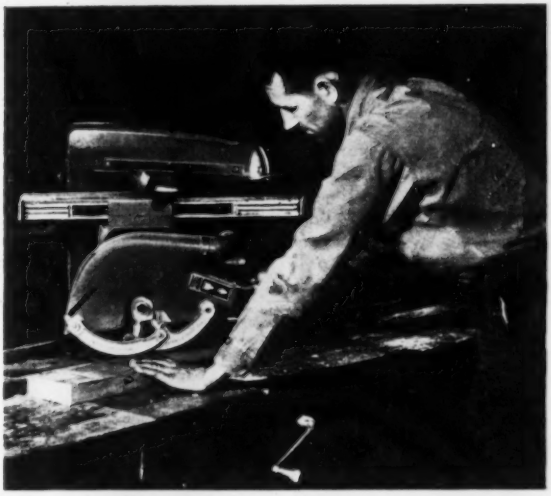
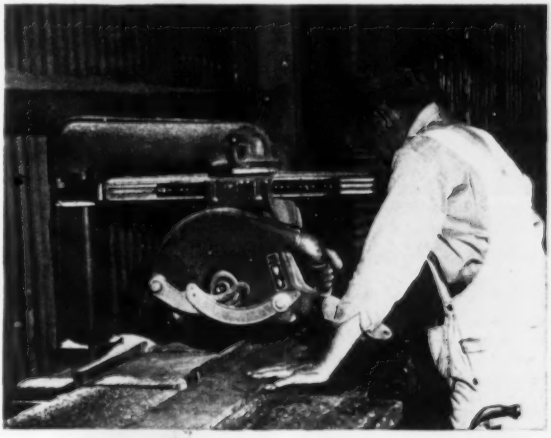


MAGNAVOX OF KENTUCKY, PADUCAH

One Delta Radial Arm Saw in the Maintenance Department of this modern plant producing speaker units has put maintenance on a par with other departments as to speed, efficiency and economy. The saw is in almost continuous use for the daily quota of maintenance jobs, as well as for making work desks, work tables, assembly tables, drawers, shelving, die racks, wooden jigs and wedges.



UNION ALUMINUM, INC., SHEFFIELD, ALABAMA

A Delta Radial Arm Saw mounted in the crating room "has paid for itself many times over," says an officer of the Company, and ranks with other labor-saving devices throughout the new modern plant. The saw is used for maintenance work, preparing crate lumber and building alterations and additions. Another Delta Radial Arm Saw is similarly employed in the Maintenance Department of the Company's sales affiliate, Southern Sash Sales and Supply Company.

the WHEELABRATOR® Swing Table SAVES for Job Shop and Production Foundry

Impressive performance records are being made with the Wheelabrator Swing Table in job shops and high production foundries alike. With this versatile multi-purpose machine large intricate castings and small fragile parts are cleaned at the same high speed and low cost—a fact proved in more than a hundred installations.

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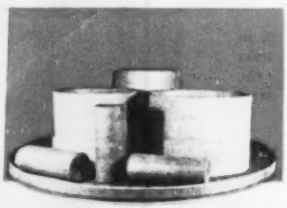
The Elkhart Iron Works of Elkhart, Indiana uses a Swing Table to clean work formerly done in 3 tumbling mills and an airblast room. The Swing Table has reduced cleaning costs per ton from $8.095 to $2.655. It has also eliminated costly breakage and produced a finish that is much more satisfactory to their customers.

cleans 20 tons of castings at cost of 6 tons

A Swing Table at the Toronto Foundry Company is cleaning 2/3rds more work with ½ the labor. It has cut metal cleaning costs 76%, saved 10% in machining costs and eliminated all breakage. The savings it makes will pay its complete cost in 2 years.



GET THE FACTS TODAY. SEND FOR BULLETIN NO. 214-A

Wheelabrator® AIRLESS BLAST CLEANING

American WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka 5, Ind.

LETTERS TO THE EDITORS

Blueprinting Mast Requirements

We are enclosing a copy of Signal Corps blueprints regarding antenna mast section requirements. We are seeking sources of manufacture for the type tubing required, but have contacted many manufacturers who can offer nothing under one-half inch outside diameter. We can use any analysis 4130, 4150 or 8630—either drawn or cold-weld drawn, but suppliers should have tapering or threading facilities as indicated on the print. Can you send names of any who might make this product?

Albert Finkel, vice president
J.F.D. Mfg. Co. Inc.
Brooklyn, N. Y.

• *Assuming you've already checked the bigger tube makers, other possible suppliers in the East are: Precision Tube Co., Philadelphia; Tube Reducing Corp., Wallington, N. J.; Tubular Service Corp., New York; Peter A. Frasse & Co. Inc., New York; Hoyland Steel Co. Inc., New York; and Anti-Corrosive Metal Products Co. Inc., Castle-on-Hudson, N. Y.*

Making a Point

STEEL reports the metal, rhenium, may be used in an alloy for pen nibs by the British (June 25, p. 109). Where can we get additional information on this development?

J. M. Williams, metallurgist
General Plate Division
Metals & Controls Corp.
Attleboro, Mass.

• *The item was based on information obtained from the May issue of Engineers' Digest, p. 141. For more details, write to: Engineers' Digest Ltd., 120 Wigmore St., London, W. 1.*

Preferred Position

We were interested to note an article reporting a process by which the strength of steel can be increased considerably as a result of preferred orientation of crystals (STEEL, June 25, p. 93). Because of our interest in the strength of steel used for machine parts, and in the plastic deformation of steel by the rolling mills that we manufacture, we would like more information on this process.

J. H. Hitchcock, research director
Morgan Construction Co.
Worcester, Mass.

• *Write to Isaac M. Diller, consulting physicist, 24 Fifth Ave., New York 11. Mr. Diller developed the process and has patents pending.*

Statistical Storehouse

Does STEEL have consolidated statistics showing steel production from 1930 to the present?

Jerome S. Glazer
Glazer Steel Corp.
New Orleans

• *Steel production figures for the period Jan. 1, 1931—Jan. 1, 1950, are among those in STEEL's 1951 Yearbook, p. 121. In 1950, capacity was 104.5 million net tons, production 96.9 million net tons. In the first five months of 1951, production totaled 43,614,444 net tons.*

Are you turning in all your SCRAP?

Don't wait for "George" to do it

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

IF you are a steel user, this important job of getting more scrap back to the mills is directly up to *you*. You just cannot afford to sit idly by while the scrap shortage gets worse. For unless everyone really pitches into this job of digging out all the scrap possible, steel production is bound to suffer, and every steel user, in more or less degree, will suffer too.

More scrap means *more* steel—it's as simple as that.

Right now some mills have only a bare two-days' supply of scrap on hand. Others have even less. Some steel-making furnaces already have had to shut down for lack of scrap. The situation is serious. Only you can help improve it.

By turning in every piece of worn-out equipment, every obsolete tool and machine, in fact every pound of iron and steel scrap you can comb out of your plant, you'll be helping relieve the worst scrap shortage since Pearl Harbor days . . . and the steel industry will be able to produce more of the steel you need.

Remember—it takes at least one-half ton of scrap to make one ton of steel. To maintain steel's present high production schedules requires more than 1400 carloads of industrial scrap *every* day. So turn in your scrap—ALL your scrap—and keep the mills rolling. This is more than a shortage. It's an emergency that vitally concerns you—and us—and the Nation.

This page would ordinarily be used to tell you about

U·S·S CARILLOY STEELS

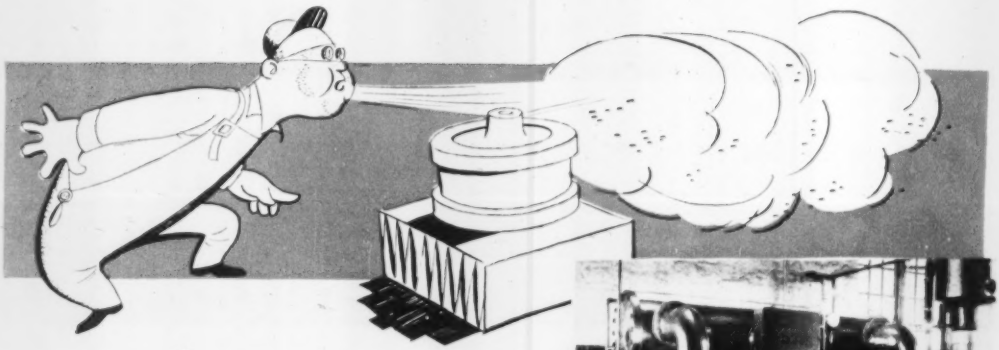
but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

UNITED STATES STEEL COMPANY, PITTSBURGH · COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

1-1348

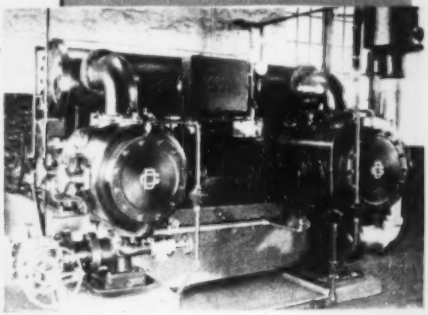
UNITED STATES STEEL

You don't have to skimp on compressed air!

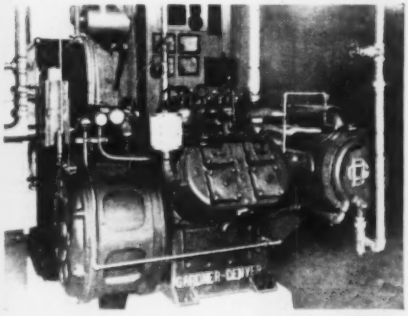


An ample supply of compressed air arms you with many opportunities to speed production—conserve man-hours—hold costs in line. Especially when it's the lower-cost-per-cubic-foot air from a Gardner-Denver Compressor.

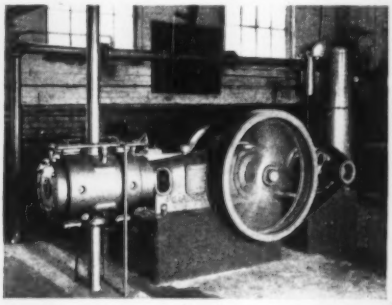
Backed by more than 90 years of quality manufacturing, Gardner-Denver Compressors handle constant peak loads—dependably . . . keep maintenance and operating costs so low you can use compressed air throughout your plant—without skimping. Write us today for complete information.



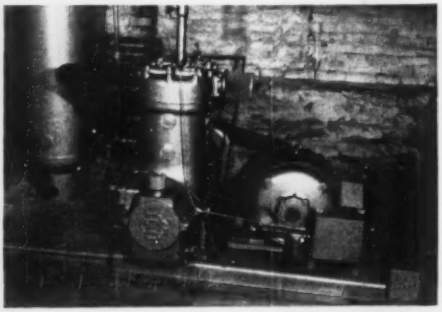
HA Two-Stage, Horizontal Compressor 593 to 1854 cu. ft. displacement per min.



WB Two-Stage, Vertical Compressor 142 to 686 cu. ft. displacement per min.



RX Single-Stage, Horizontal Compressor 89 to 1292 cu. ft. displacement per min.



AA Single-Stage, Vertical Compressor 32 to 183.6 cu. ft. displacement per min.

SINCE 1859

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Gardner-Denver Company, Quincy, Illinois

In Canada:

Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

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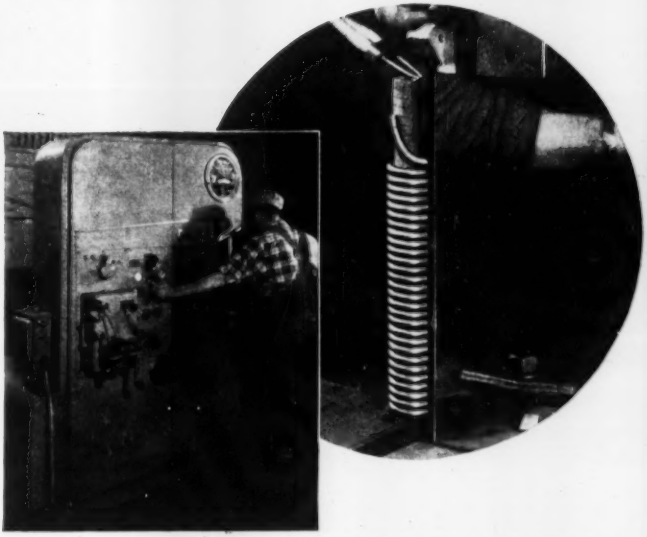
ELIMINATES COSTLY MILLING OPERATION ON SPLIT RINGS

ECONOMICAL DoALL BAND MACHINING DOES JOB IN 1/3 THE TIME, FREES MILLING MACHINE FOR OTHER WORK

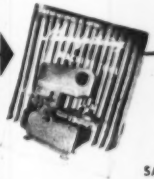


BAND MACHINING CAN DO 100's OF JOBS FASTER, AT LOWER COST

DoALL Band Machines cut *continuously*—they slice the material apart, instead of reducing it to a pile of chips. They are fast, they are versatile, they are easy to use. There are DoALL Band Tools for every cutting, filing, grinding, honing and polishing job.

Send for Catalog

Learn about the complete machining facilities offered by this modern band machine.



ASK Gates City Iron Works, Omaha, Nebraska, about the DoALL Contour-matic Band Machine! They were cutting split rings from ¼" cold rolled steel coils on an expensive milling machine. A DoALL MP-20 slashed time for the job by two-thirds and released the milling machine for other work.

In this same plant the MP-20 used for friction sawing of thin stainless cut the operation time in half.

You can cut anything with a DoALL MP-20 Contour-matic — any material, any shape. Ask to have a *demonstration* of this versatile, time, money and material-saving machine tool right in your own plant. A DoALL sales service engineer will bring it to you, *show you* what it can do. Call your local DoALL Sales-Service Store or write:

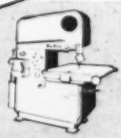
THE DoALL COMPANY • 254 N. Laurel Ave. • Des Plaines, Ill.

27 SALES-SERVICE STORES

DoALL

INDUSTRY'S NEW TOOLS

B-1



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"Tycol Anorustols prevent rust... protect all metals... clean off easily"

That's true! Tycol Anorustols form protective coatings—keep moisture and oxygen from attacking metal surfaces. They are easily applied by swab, dip or spray. Various consistencies and types of Anorustols are available to meet every condition where "rust protection" is needed.

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Production Pointers from GISHOLT

GISHOLT

TIME-SAVING IDEAS

Why Gisholt's Recommendations Are Unbiased. In helping you solve your turning problems, Gisholt engineers have no reason to favor one type of machine over another except on the basis of its ability to best serve your needs. For Gisholt manufactures both manually operated turret lathes and automatic lathes.

C/F TURRET LATHE HANDLES AWKWARD PART

Face Plate Fixture Economical For Small Lots

The irregular shape of these bar feed bodies presents quite a chucking problem. That, combined with small lot production, means you have a real problem. We are solving this problem right in our own shop by putting the job on a 5L Saddle Type Turret Lathe.

A special face plate fixture is mounted on the face of the 32" Gisholt scroll chuck. This is counterweighted to permit using higher spindle speeds. The part is quickly bolted to the fixture and rigidly held for multiple boring, counterboring and facing operations. At the completion of the first operation, the part is removed, a spacer added to the fixture, the part is turned over, and second operation work is performed. The cost of the fixture is more than made up by the rapid handling of the job.

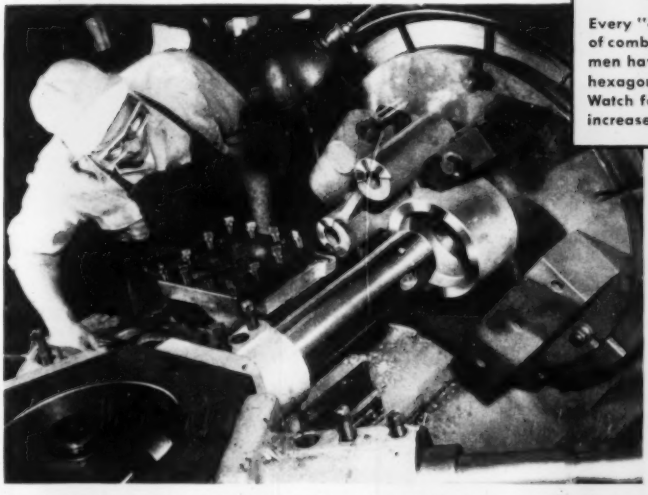
Cross Feeding Turret Helps Simplify Job

Turret tooling is kept to an absolute minimum. A single tool bit in the square turret handles facing of the hub and intermittent facing cuts. A single boring bar in the cross feeding hexagon turret handles the rough and finish cuts in the bore and counterbores. Thus, simplified tooling keeps down the investment and reduces the setup time. Further savings are made possible because the rigid construction of the machine permits simultaneous use of the square and hexagon turrets.

Simple tooling, plus simultaneous machining from both turrets and a counterweighted face plate, results in maximum efficiency.

Are you missing a bet?

Every "old-timer" in your shop knows the value of combined cuts on a turret lathe. But, many new men have not learned to save time by using the hexagon and square turrets at the same time. Watch for this in your shop . . . it will help you increase production.



This close-up shows how a smart setup can make a fast, easy job out of an otherwise slow and awkward one. Note the special counterweighted face plate.

Machined part after boring and facing the diameters and support bearing surfaces.

New literature describing the 5L Saddle Type Turret Lathe is now available.

A GOOD WAY TO MACHINE PULLEYS

From Rough Casting to Finished 2-Step Pulley in 1.2 Minutes

Suppose you got a large order for two-step pulleys like these. How would you handle the job?

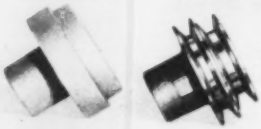
This manufacturer does it right . . . on a Gisholt No. 12 Hydraulic Automatic Lathe. The 5" parts are held in a simple 3-jaw air chuck. An air-operated tailstock supports the piece under the heavy cuts.

On the front carriage you have a special combination tool block with two turning tools mounted above the work and five grooving and facing tools conventionally placed at the side. On the rear slide you have a skiving tool mounted underneath the work and a form tool on centers. Here is the cycle:

1. Front carriage feeds to the left and turns the two diameters with overhead tools.
2. Feed changes from longitudinal to cross feed, and the lower tools rough out the grooves and straddle-face both ends.

This No. 12 Hydraulic with 5 sets of tools completes 2-step pulley every 1.2 minutes.

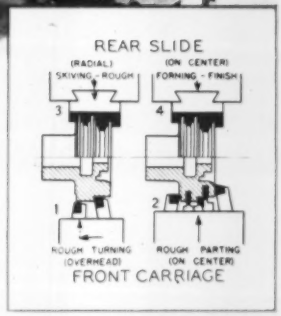
Rough casting and finished pulley.



3. Rear slide brings in skiving tool to rough form the grooves. Tools are below the centerline and pass beyond after completing their work.
4. Forming tools feed in on the centerline to finish the job.

Entire operation takes 1.2 minutes, floor to floor.

Multiple cuts with four sets of tools provide fast, automatic production at minimum cost.



Drawing shows 4 sets of tools that do entire pulley machining job.

DELICATE PARTS GET GENTLE TREATMENT FROM RAM TYPE TURRET LATHE

Special Tooling Simplifies Machining of Cream Separator Bowls

Here a Gisholt Ram Type Turret Lathe has the rather tricky job of machining the tubular shaft and base for cream separator bowls.

Support for the long and rather weak stem is provided by a roller rest turner mounted on the hexagon turret. On the third turret face is an adjustable head with four tools for machining the several surfaces at the bottom of the conical base.

Single Point Tool Generates Angle

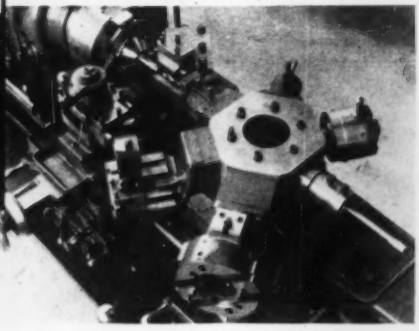
The conical surface is nicely handled with a special angular mounted tool slide on the back of the square turret cross slide. Because this surface is too wide, and because the material is rather difficult to form or shave with a single broad tool, this angle is generated with a single point tool. The photo shows how it's done at the same time the drill does the center hole. There is a pusher plate on the face of the drill holder which, as the hexagon turret advances, contacts the roller on the angular slide and pushes this along to turn the cone at the same time.

The square turret has a special multiple tool block with two tools (instead of the usual one), to face the end of the stem and the flat surface at the base of the stem.

Special tools on the hexagon turret and square turret combine to achieve a maximum number of cuts with a minimum number of approaches to the work.

(Above) The heavy lines show the many machining operations on these parts for cream separators.

Tooling on Gisholt Ram Type Lathe for machining tubular shaft and base of cream separators.



GISHOLT

GISHOLT

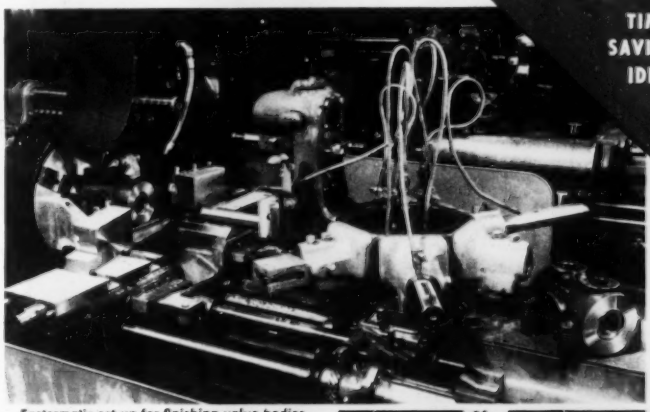
TIME-SAVING IDEAS

A SMART SETUP FOR HYDRAULIC VALVE BODIES

Minimum Changeover on Fastermatic

Perhaps you can use an idea like this: an automatic turret lathe set up to handle four different sizes of valve bodies, requiring only such minor changes as spacers in the holding fixtures, individual drills, boring bars, etc. The machine is a Gisholt 1F Fastermatic Automatic Turret Lathe.

The work itself is simple enough. It begins with a boring bar that sizes the cored hole in the casting—just deep enough to give the core drill a true start. The core drill is followed in order by counterboring, chamfering, finish boring and facing.



Fastermatic set up for finishing valve bodies. Note completed part on machine at right.

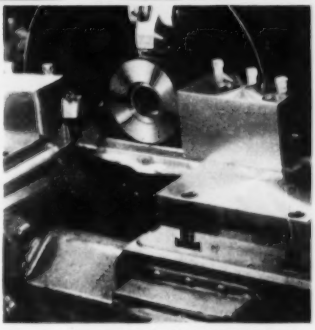
Tool Relief Provided

A conventional boring bar does the finish boring. When the cut is completed, a stop bar and cam move the entire bar toward the spindle centerline so it may be withdrawn without leaving a "snake track."

The tool blocks of the independent front and rear cross slides have adjustable slide tops and are fitted with T-slot mounting bases. The rear slide, which does the finish facing, is equipped with hydraulic tool relief. At the completion of the cut, the slide tips away from the work several thousandths to permit the tool to clear the work as the slide is retracted.

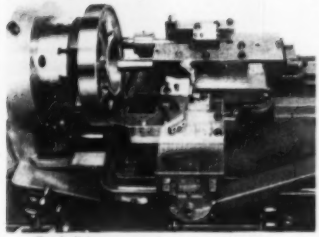
All operations in machining these valve bodies are performed automatically by the Fastermatic. It's the ideal way to handle such work—with *one* operator able to handle two or more machines. Catalog on request.

The Fastermatic handles a number of rough and finish cuts in one chucking and allows simple changes for difficult sizes—all with a standard automatic cycle and with tool relief where needed.



Close-up of rear slide equipped with hydraulic tool relief for clearing work after facing.

HERE'S THE RIGHT COMBINATION FOR FASTER FINISHING OF DIFFERENTIAL CARRIERS



Tool slide arrangement for machining gear carriers.

Simplimatic Brings More Tools to Bear on Work

The photo shows second operations on a differential carrier—the kind of job that's a "natural" for this Simplimatic Automatic Lathe.

The wide platen accommodates individual tool slides with each slide feeding in the desired direction and at its own rate of feed. This permits each of the required number of cuts to be made in the most advantageous manner. The operations here are: turning the O.D., straddle facing both sides of the rim, facing and counterboring the hub, and at the same time finishing the radius or spherical bore in the center with a swinging tool actuated from the front tool slide.

The large platen table permits a choice of slide arrangements so each tool can work to best advantage. This makes it the equivalent of a "Special" machine designed for high production work.

GISHOLT

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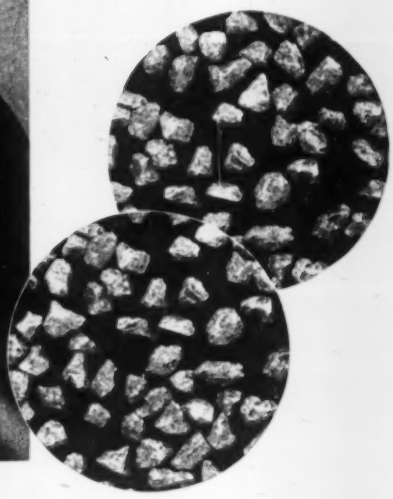
Because Every Grain Works!



One of the biggest advantages of Norton ALUNDUM Polishing Abrasive is its complete uniformity of grain-size and shape. This means you get no oversize grains to mar the finish — *and no undersize grains to loaf on the job.* That's why, with every grain a working grain, ALUNDUM Abrasive lasts longer and performs better.

In addition, ALUNDUM Abrasive is uniform in chemical composition and crystal structure — extremely hard and tough for fast, clean cut — and has high capillarity that assures firmer adhesion of grain to wheel when glue is used as the adhesive. It is available in sizes and with surface treatments for best results on every polishing job.

Write for Norton Booklet No. 1340, "Setting-Up Polishing Wheels and Belts," containing many helpful polishing tips.

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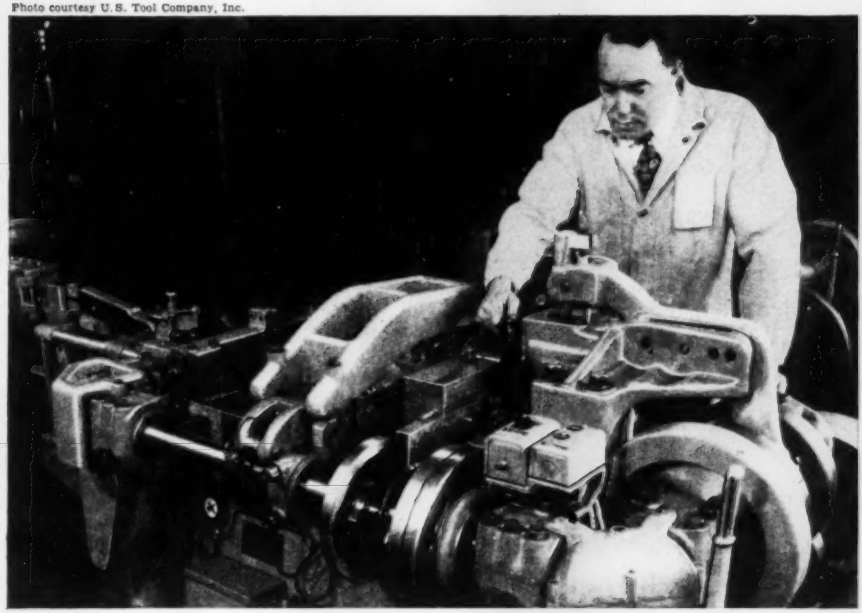
Making better products to make other products better

FLAT SPRING STEEL

Photo courtesy U. S. Tool Company, Inc.



You can always count on Roebling for absolutely uniform quality

FOR FLAPPER VALVES, shoe shanks, measuring tapes! For steel rules, curtain springs, snap springs, lock springs, drop wires, sinker steel and a thousand and one other exacting uses, you'll find that Roebling high carbon flat mechanical spring steel is unsurpassed.

Roebling's complete facilities for producing flat spring steel give us positive control over all phases of manufacture. The final product is dimensionally and metallurgically uniform... cuts down machine stoppages... minimizes rejects. And Roebling flat spring steel is made as you want it—annealed, hard rolled untempered; scaleless tempered; tempered and polished, blued or strawed.

Large quantities of Roebling specialty wires—flat, round and shaped—are required today in the national rearmament program. You can look to us, however, to do everything possible to meet your requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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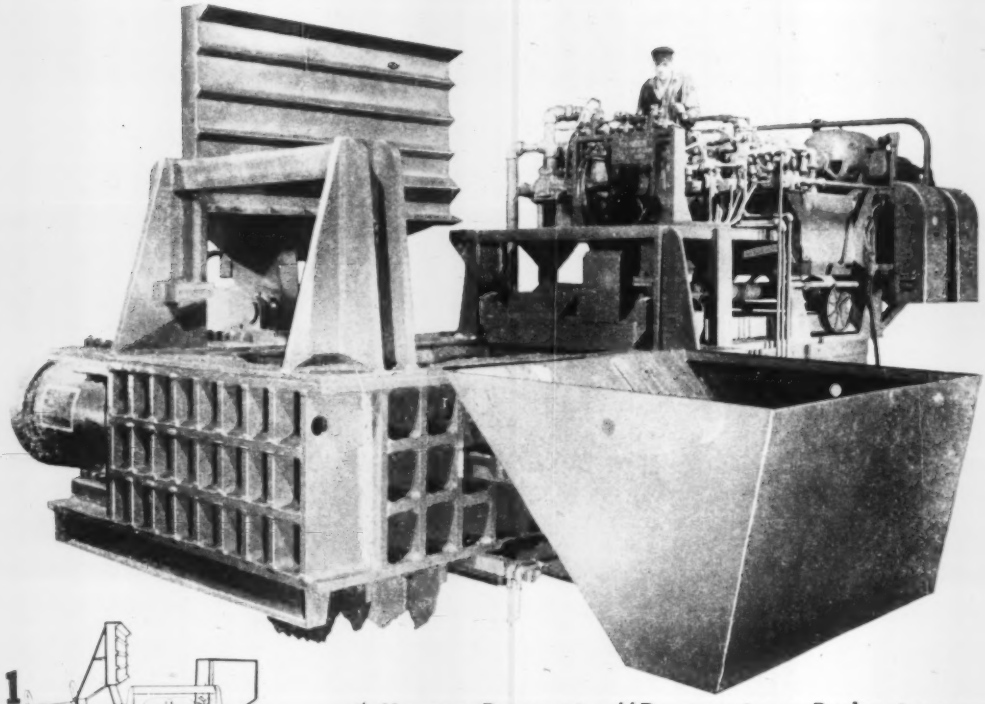
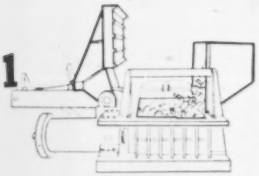
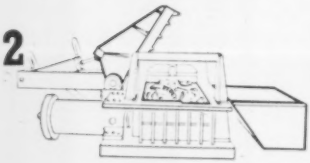
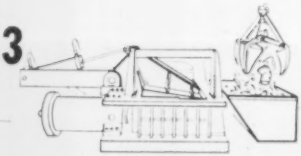




Skip-Pan Loader dumps scrap metal into charging box. Auxiliary Compression Door is in "up" position ready for immediate action once operator touches hydraulic controls.



Skip-Pan returns to loading position as Auxiliary Compression Door begins its "one stroke" compressing operation.



Door compresses scrap, permitting charging box door to be closed without further arranging. During baling cycle Skip-Pan is reloaded and charge dumped into box as soon as bale is ejected.

★ Users Report—"Dempster-Balesters Turn Out 25% Greater Tonnage With Auxiliary Compression Door" . . .

The high-speed Model "600" Dempster-Balester, shown above, produces bales at the rate of 6 to 7½ tons per hour. With Auxiliary Compression Door, which users report increases the 6 to 7½ ton rate by a conservative 25%, this Dempster-Balester is making scrap metal baling more profitable than ever before! With its simple construction and two ram design, this big capacity press is easy to install . . . economical to operate. The hydraulically operated Auxiliary Compression Door compresses heaped scrap into the charging box with a 45-ton force. The hydraulically actuated Skip-Pan Loader, another cost-cutter, is standard equipment on all models. This invaluable feature permits preparation of a new full charge while press is baling. Illustrated at left, is the 1-2-3 production punch of a Dempster-Balester with Auxiliary Compression Door and Skip-Pan Loader. Write today for completely illustrated folders on the Dempster-Balesters, Models "600," "275," and "128." All are products of Dempster Brothers, Inc.

THE "275"

The Dempster-Balester Model "275" turns out scrap metal bales at the rate of 3½ to 4 tons per hour, plus a normal 25% increase with Auxiliary Compression Door. It produces high density bales weighing between 300 and 400 pounds.

DEMPSTER BALESTER

DEMPSTER BROTHERS

681 DEMPSTER BLDG., KNOXVILLE 17, TENNESSEE

Van Huffel
cold-formed metal tubing
and shapes solve problems
for the makers
of

farm equipment

It may be a far cry from vegetables to Van Huffel, but farm equipment manufacturers will tell you they are both basic in the scheme of things.

For instance, where deadweight must be cut from a tractor without sacrificing strength . . . where a farm implement must be easier to carry, move or lift without complicated fabrication . . . a lot of production problems are being solved by the versatility of Van Huffel metal shapes and tubing.

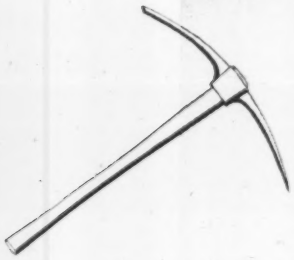
VAN HUFFEL

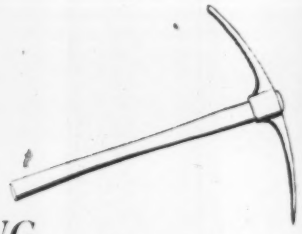
TUBE CORPORATION • WARREN, OHIO

WELDED, LOCK SEAM, OPEN SEAM, BUTTED TUBING, SHAPES AND MOULDINGS

SCRAP

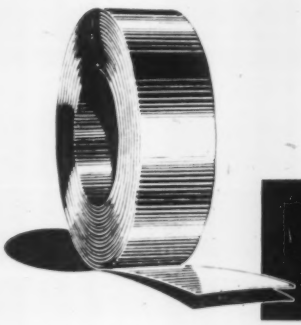
Gold is where you find it!





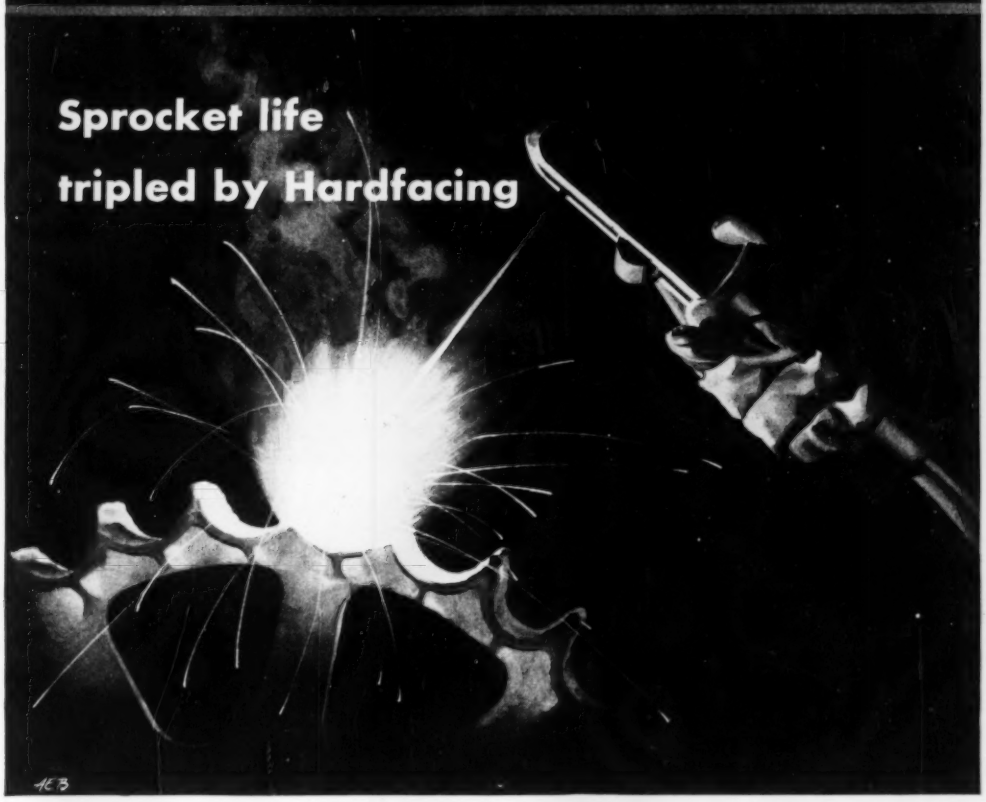
all it takes is a little DIGGING
... so DIG, brothers, DIG!

Dig out that plant scrap from every nook and cranny—turn in your production scrap on regular, frequent schedules—and you'll feel good because you're *doing good* for the entire metal industry!



Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

ANOTHER AMERICAN Brake Shoe COMPANY PRODUCT THAT CUTS THE COST OF WEAR



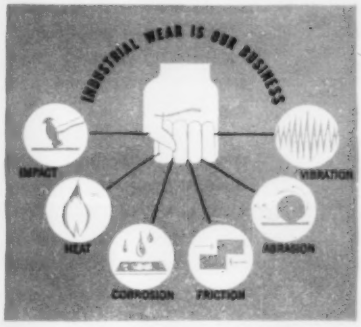
Repair instead of replace . . . on the job . . . at less cost

The sprockets that give 20-ton bulldozers their herculean push take a hard fisted beating as they slam into the track that moves the monster. Add to this destructive action, the gouging and cutting of sharp edged sand and stone, and you have wear at its worst.

Hardfacing . . . the laying of a hard, tough, wear-resistant metal surface on a softer base metal, by gas or arc welding . . . is a cost-cutting answer to this wear problem. It makes parts hard, yet tough, to resist the wear of impact, abrasion, corrosion and heat.

Amscoating is a method of hardfacing that often reclaims such worn out parts for less than original cost. It lengthens the life of old or new parts often beyond original service. Amscoating can be done in the field and on the job quickly and cheaply by any competent welder.

Amscoating is based on the know-how derived from thousands of practical field applications, with directly traceable savings in lower maintenance and replacement costs, and fewer shutdowns. Our Amsco engineers will welcome the opportunity to apply their experience to your hardfacing problem. Write Department G for literature about Amsco Welding Products.



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230 PARK AVE, NEW YORK 17, N.Y.

10 Divisions of American Brake Shoe Co. produce wear-resisting parts in 55 American and Canadian plants.
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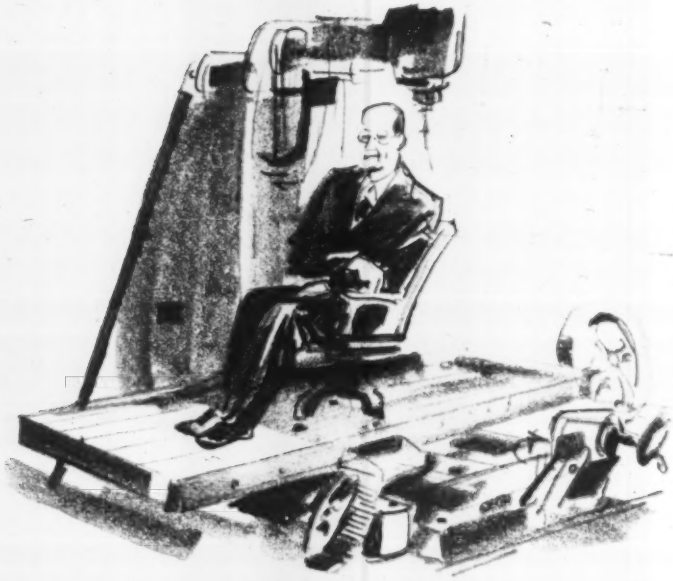

Don't just sit on it—
SCRAP IT... please!

There it sits—in some corner of your plant—a great big hunk of machinery—its protective coating of oil or grease pot-black with the accumulated dust of years. You know very well you'll never put it to work again!

Sure, that old machine, those tools, dies and other antiquated equipment once represented a heavy investment. But now they've lived their useful lives, paid their way and turned a profit for you. So please get them off to the scrap pile. Send them back to the mills where they'll help make more of the steel American industry needs so desperately.

We urge you to start a scrap drive *now* in your own plant. Of course, your production scrap is moving regularly—it's the heavy solid stuff that's also needed. Remember, we all need more steel. And more steel requires more scrap. So please make up your mind. Give orders to scrap that questionable equipment today.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. — PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

The Metalworking Outlook

Cause for Alarm?

Some 80 or 90 per cent of the direct Air Force procurement dollar is going to large firms. Air Force people called before the Senate Small Business Committee to explain that fact stuck by their guns and insisted that the nature of their requirements dictated that not more than 20 per cent of their buying could be done with small companies. The other services, although they are more partial than the Air Force to small business, are also placing most of their direct contracts with large companies and are using increasingly the Air Force argument to support their position. The situation is not as dark as Congress believes because much of that direct contract money is filtering down through subcontracts to small firms.

On Wages and Materials

But small business has some legitimate complaints about the treatment it's receiving under government controls in other economic spheres. Small firms are having more trouble getting their CMP steel tickets cashed for the fourth quarter than the bigger companies. Wage controls also are harder on the little fellow than on the big, because the industrial giants have pension, insurance and cost-of-living provisions in their labor contracts which—in effect—mean they can offer more money for scarce skilled labor because the average small firm does not have such clauses in its wage agreement.

Slight Coolness

At the moment there's coolness between the Interstate Commerce Commission and the Office of Price Stabilization because the ICC granted the freight increase against OPS's advice. Railroads can increase freight rates for a limited period by 9 per cent within the eastern territory and 6 per cent within the southern and western. Rates on freight moving between those three territories are limited to a 6 per cent increase. New rates will add an estimated $548 million to the railroads' annual revenue—and increase industry's costs by that much.

Silence on Auto Prices

Labor unions have been highly articulate in damning most proposed price increases, but they are saying surprisingly little about price tag markups requested by most of the auto builders. That's because wily Walter Reuther of the UAW wouldn't be too provoked if auto prices do rise. Most requests ask for increases to reflect only direct labor and material costs boosts since Korea.

Auto Scrap Drive Starts

An automotive scrap drive is under way, co-ordinated by an Automobile Manufacturers Association committee whose chairman is J. A. Lacourse of Packard Motor Car Co. The group proposes: A salvage authority at each company to seek out dormant scrap; particularly

Production Engineering News—p. 65 The Market Outlook—p. 123

obsolete tools and equipment; prompt disposal of scrap; authorization to vendors to dispose of obsolete equipment; better segregation of scrap; auto dealers' co-operation with local scrap mobilization committees.

Another Kind of 5 Per Cent

Are you taking advantage of the five per cent? That's the deduction from net earnings before taxes which corporations are permitted to make for expenditures on educational, scientific and welfare purposes. A National Planning Association study reveals that American business has been slow to realize the opportunities arising from the five per cent provision. In the last few years expenditures have been running at only 0.7 to 0.8 per cent of net corporate income. If 5 per cent of the total net corporate income were actually spent for educational, scientific and welfare purposes it would amount to about $2.2 billion in 1951.

Gas Supply Prospects Dim

The outlook for this winter's natural gas supply is dim; hence the government's plan to restrict sales of the fuel by limiting new consumers' use. The industrial load has not increased measurably in the past few years but home consumption has risen greatly, changing industry's proportion. The problem is not the actual shortage of natural gas, but the scarcity of pipe to transport it.

Never Say Die

That New England steel mill proposal just won't die, despite adverse reports by at least two economic studies and the refusal of several steel companies to build and operate the project. The latest steel producer to be approached on the matter is Barium Steel Corp. Barium President Rudolph Eberstadt says that no definite negotiations have been made and that discussions thus far have been strictly informal.

Straws in the Wind

Switching of the defense lending authority from the Defense Production Administration to the Reconstruction Finance Corp. may be announced soon . . . Sen. Blair Moody (Dem., Mich.) is moving his subcommittee hearings to New York Aug. 20 and 21 to look into the "nickel gray market" . . . Federal Trade Commission has officially dropped its long-standing charges on freight absorption against the steel industry; the action is merely for the records because the FTC came to an agreement with the industry last June .

What Industry Is Doing

Die casters are unhappy about pricing treatment under government controls, fairly well satisfied about wage curbs and feel they have had a reasonable deal on materials regulations (p. 37) . . . NPA is working on remedies for the fourth-quarter steel tangle which may include more liberal allotments to warehouses (p. 38) . . . More government help is coming for machine tool builders (p. 39) . . . The missing link in production of power transmission chain is nickel (p. 41) . . . Lawn mower makers are cutting a wide sales swath (p. 41) .

UNITED
CLUTCH HEAD® SCREWS

Here are four GOOD reasons why you should use Clutch Head screws in your assembly lines:

1. The deep straight-walled recess requires less "end pressure" and prevents screw driver ride-out.
2. Over and over again you can bring back the Type "A" bit to full efficiency by just grinding back the point.
3. See how the "lock-on" feature resists dis-engagement. What a help in hard-to-get-at places!
4. The strong substantial Type "A" bit with the large roomy entrance speeds up assemblies.

Ask for a descriptive brochure.

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DUCTILE IRON
replaces steel
IN SHAFTING

finished cost { **28% less than that of forged steel shafts**

DUCTILE IRON is a cast ferrous product that combines the *process advantages* of cast iron along with many of the *product advantages* of cast steel.

In less than two years, ductile iron has attained wide acceptance because it offers excellent castability, high mechanical properties and good machinability. Parts cast in ductile iron show superior strength, high modulus and excellent shock resistance.

Typical Current Applications: Axle housing for road machinery, steel rolling mill bearings, chain swivels, diesel cylinder heads, grates, pipe fittings, rails, etc.

AVAILABILITY: Send us details of your prospective uses, so that we may suggest a source of supply from some 100 authorized foundries now producing ductile iron under patent licenses. Request a list of available publications on Ductile Iron... mail the coupon now.

The International Nickel Company, Inc.
Dept. S., 67 Wall Street, New York 5, N. Y.

Please send me a list of publications on: **DUCTILE IRON**

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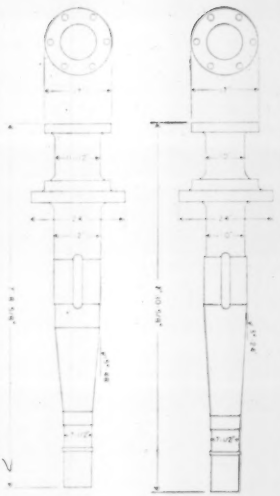


DUCTILE IRON FORGED STEEL

COOPER-BESSEMER CORP., Mt. Vernon, Ohio, adopted ductile iron generator shafts to replace those of forged steel. Corresponding changes in design and dimensions are shown above.

Ductile iron provides unusual advantages. Its tensile strength runs between 83,000 and 94,000 p.s.i. as cast, on test bars cut from a full diameter extension on the small end. Unlike forged steel, which is a product obtained from outside sources, ductile iron shafts are cast as well as machined in the company's own plant. They make possible a low finished cost... 28% less than that of a forged steel shaft made to the dimensions shown above.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Fact vs. Hunch

Since the end of World War II hundreds of American industrialists have visited foreign countries, chiefly in Europe, to compare notes with business acquaintances in those countries as to the outlook for peace or war. On returning from their visits, many of these executives have summarized their observations in writing and copies have been given limited circulation among associates and friends.

As one reads these reports, one is strongly impressed by the fact that almost without exception, they reflect a state of mind which is quite at variance with that presented to us by the official spokesmen of our own government in Washington. Our friends in industry in foreign countries are calm in their appraisal of the threat of communism, whereas our servants in Washington seem to be almost hysterical in their size-up of it.

This difference in method of appraisal is important. Most responsible persons are more likely to give credence to the views of an individual who appraises situations objectively than to one who is swayed by his emotions. Thus, in the case of the threat of communism, one is almost forced by our government's hysterics to pay heed to those observers who try to understand Russia's aims realistically.

The objective appraisers certainly are not as fearful of an immediate World War III as is our own State Department. Moreover, some foreign observers think that bungling by our government is as likely a threat of war as action by the Kremlin. Also, in comparison with the views held by foreign industrialists, our government's statements greatly exaggerate the strength and potential of Russia and minimize unduly the power and resources of the United States and its allies.

Such conspicuous differences of opinion on such important matters raise the question as to whether our government is as reliably informed about Russia as it should be. At times it looks to the average citizen as if this great build-up of fear is based more upon hunch and hysterics than upon fact and calm appraisal.

More cold fact and less hot emotion would do much to rewin public confidence.

E. C. Shaner

EDITOR-IN-CHIEF

GOOD PLACE TO WORK: A count of employment in mid-July showed a national working force of 62,526,000, a new record for that month. With so many persons gainfully employed, many metalworking plants encounter abnormal problems not only in procuring skilled workers but also in holding them.

A round-up of experience of many employers

shows scores of methods by which they attract skilled workmen to their plants. Most effective are four: Newspaper advertising, contacts with schools and colleges, employment agencies and employees' word-of-mouth recruiting.

Assuming that the metalworking employer is successful in recruiting an adequate working force, he still faces the problem of retaining them on the payroll. Competition for the important skills is terrific. The money incentive is only one of many. In the final analysis, if you have managed throughout the years to gain for your shop a reputation as a "good place to work," you have an edge that should pay big dividends during the present emergency.

—pp. 48, 56

FOUNDRIES CHALLENGED: Curse of production under pressure is the bottleneck. During the current mobilization drive, Washington moves from one bottleneck to another. Right now there are indications that the latest candidate for bottleneck emphasis is the usually dependable foundry industry. The pinch is in heavy steel and malleable castings. Gray iron castings are not too much involved except for the larger machinery bases.

One reason why the castings shops are in their present difficult role is that modern military needs call for heavy production equipment, including presses and machine tools. Beds running up to 50 tons each are not uncommon. In recent years, foundrymen have made marked progress in quality and uniformity of product. They will meet this new challenge creditably.

—p. 44

2125 TONS IN 6 WEEKS: In company with many other metalworking firms, Chrysler Corp. is heeding the call for speeding the scrap cycle. During the first month of its campaign to ferret out dormant ferrous scrap, it found it could dispense with 600 tons of obsolete tools, dies, etc. During the two weeks following that first month an additional 1525 tons of similar equipment was scrapped. This yield of dormant scrap is in addition to the 35,000 tons of production scrap generated monthly by Chrysler.

An interesting feature of Chrysler's scrap campaign is that it is intended not only to recover dormant scrap from Chrysler's own plants, but also from plants of many of its suppliers. For instance, of the dormant scrap thus far recycled as a result of the campaign, half has come from Chrysler plants and half from suppliers' plants. Perhaps other large manufacturers can use this supplier-plant hook-up to advantage.

—p. 52

ACTIVITY IS LAGGING: In spite of spectacular performance in some lines, industrial activity is off moderately from previous highs. Depending upon which of several indices of industrial activity you choose to employ, the rate in mid-August is the lowest since November or December of last year.

Among the major factors contributing to industrial activity, steel ingot output, electric power distribution and petroleum production continue to outdistance performance of a year ago by substantial margins. Construction volume also is far ahead of last year's comparable figure but it is falling rapidly from recent weekly and monthly records. Soft coal output and revenue freight car loadings are off only slightly from a year ago. The most drastic decline is in automobile output. Car and truck assemblies are a bare half of what they were a year ago.

Reversal of the downward trend in industrial activity can come only from a step-up in defense work and right now it is at least 25 per cent behind schedule.

—p. 55

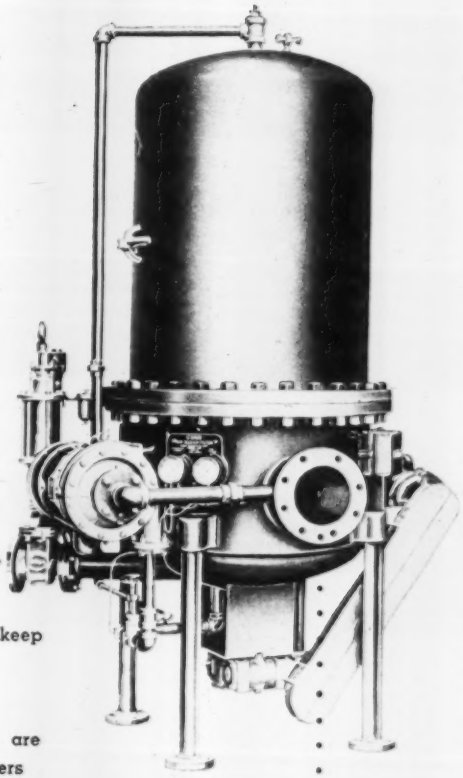
430 IN RESCUE ROLE: Shortage of nickel is causing many manufacturers to modify time-honored specifications drastically. For instance, hundreds of companies which have used 18-8 grades of stainless steel now are being forced to consider type 430, which is a 17 per cent chromium stainless steel.

Type 430 is not new. It has a good record of successful application. However, the shift from 18-8 to type 430 involves difficulties unless the manufacturer takes special pains to avoid pitfalls. At this point, one comes into head-on collision with the role of the supplier's sales engineer. His problem is to help the customer to the extent of his ability or opportunity, but at the same time he must display some tolerance of the views of the customer's technicians. In cases of doubt the best procedure is a sample order for a trial run. Good teamwork will facilitate intelligent substitution.

—p. 66

WASHING MACHINE TO INDUSTRY...

CUNO'S Flo-Klean Filter ... built with an ACME all-welded shell



In industrial processes where light liquids circulate and where sludge, pipe scale, or other contaminants are unavoidable, you're apt to find a CUNO Flo-Klean Filter washing out all foreign matter and sending the water, coolant, or cutting oil on its way with practically no loss of liquid or line pressure . . . thus eliminating abrasive wear on pump fittings, spray nozzles, and control equipment.

Flo-Klean's shell with its complex interior is all-welded by ACME TANK & WELDING to the exact specifications of CUNO engineers. ASME inspected, designed to withstand hard abrasive wear, this rugged weldment will help keep Flo-Klean on its washing job through years of continuous service.

Manufacturers throughout industry, like CUNO, are making a superior product because ACME engineers fabricated a better custom weldment to meet their requirements. An especially-designed ACME weldment may improve your product.

Write ACME today; send your blue prints or a rough sketch . . . you'll receive a prompt quotation.

- A.S.M.E. Qualified Welders • National Board Approved
- Hartford Steam Boiler Inspection Service • A.P.I. Approved
- Rating Approved by Natl. Assoc. of H.P. & A.C. Contractors
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WEST HARTFORD 10, CONNECTICUT

Don't Scrap PROFITS- from Scrap!

Today your DORMANT SCRAP* means more steel to help meet all-time high defense and domestic demands. Your country NEEDS it!

Today your DORMANT SCRAP* commands high prices.

HOW TO TURN SCRAP INTO MONEY...

with an organized dormant-scrap round-up in your plant:

1. Appoint a top executive with authority to make decisions to head the salvage drive.
2. Organize a Salvage Committee and include a member from every department.
3. Survey and resurvey your plant for untapped sources of dormant scrap. Encourage your employees to look for miscellaneous scrap and report it to the committee.
4. Sell your entire organization on the need to scrap unusable material and equipment.
5. Prepare a complete inventory of idle material and equipment. Tag everything not in use.
6. Start it back to the steel mills by selling it to your regular scrap dealer.
7. **KEEP AT IT!**

* Your DORMANT SCRAP is any obsolete, broken or wornout and irreparable machinery, tools, equipment, dies, jigs or fixtures, etc., that may encumber your premises. These, in the language of steel, are *scrap*, vital to steel production, and hence convertible into cash.

Steel is normally made from scrap and new pig iron in about a 50-50 ratio. The use of scrap means *better* steel, *faster* . . . because scrap has already undergone one refining process. Today under pressure of domestic and defense demands, the steel industry is consuming purchased scrap at the rate of 100,000 tons per day . . . an all-time high. *Your* dormant iron and steel scrap is *urgently* needed.

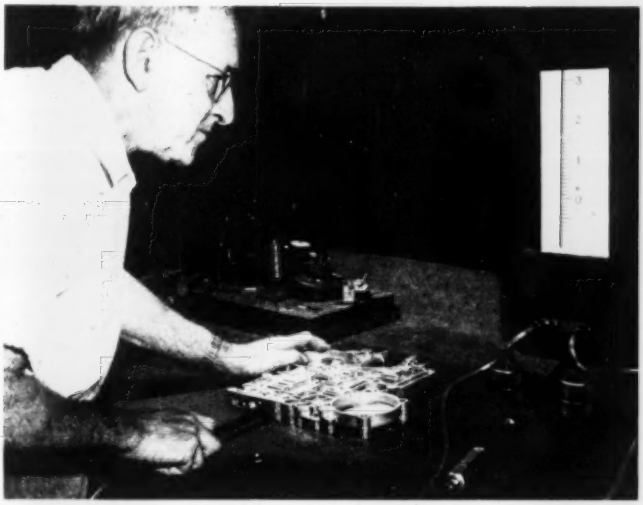
Round-up and sale of your dormant scrap NOW will benefit you, all steel users, and our country by:

1. Keeping the steel furnaces producing at their highest rate in history.
2. Conserving our vital iron ore reserves. The *more* scrap used in steelmaking, the *less* ore needed.
3. Making *better* steel, *faster*.

INLAND

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois



Measured Against the Die Casting Industry . . .

What's Your Score Under Curbs?

You can see whether you have fared well, badly or indifferently by comparing your experiences under controls with those of the bellwether die casting industry

HAVE YOUR experiences under government pricing, wage and distribution controls been good, bad or indifferent?

Calibrate your measuring stick for federal controls by comparing it with the experiences of a bellwether industry—die casting—chosen because the thousands of components it provides for hundreds of civilian and military products makes it an across-the-board indicator. Many die casters have violent complaints a bout prices; they're doing just so-so on wages; they're doing surprisingly well on distribution.

Prices—One major problem in pricing is not the actual OPS ceiling, but the paperwork required to figure out what that ceiling is. The industry turns out thousands upon thousands of different items, most of them parts for other products. One company alone has 20,000 live dies for different parts. The job of figuring out the ceiling price for so many different components is monumental. What's more, it has to be done rapidly because die castings come under CPR 60 which is supposed to go into effect Sept. 1. Many die casters don't think they can make the deadline and hope to meet with OPS this week to reach some understanding.

Although most members of the industry think OPS has been reasonable about the actual ceilings permitted, some are complaining about rollback provisions in CPR 60. Some customers are reported holding up on orders until after the deadline of Sept. 1 to take advantage of the provision.

Wages—Die casters have just about the same experience with wage curbs as other metalworking industries. They are losing some workers —mostly semi and unskilled—to new defense plants where pay is higher.

The manpower situation among die casting shops is fairly good at the moment, partly because demand for their products has declined slightly in the last month. But if military needs pick up substantially, most die casters fear labor shortages.

Distribution—The industry feels itself fortunate in distribution controls. Aluminum and copper regulations under CMP have been instituted with reasonable smoothness—nothing like the tangle in steel. Die casters, of course, could use more zinc and aluminum than they're getting, but they are not complaining. The materials situation is helped by the industry's defense business which is now an estimated 20 to 25 per cent of the total; the proportion is rising. More zinc and aluminum will be used in 1951 than 1950 when 340 million pounds of zinc, 127.5 million pounds of aluminum and 1.1 million pounds of magnesium were consumed. Minor quantities of lead and copper alloys were also used.

The sales level of the jobbing shops for this year should be a little ahead of the $225 million volume in 1950, even if the second half of 1951 does not reach first-half sales peaks, as now looks probable. Sales figures for captive shops are not available.

Size and Shape — American Die Casting Institute, New York, estimates that about 700 companies in the U. S. have at least a die casting machine. Some 400 of those are job shops, about 300 captive. The institute has 85 members, most of them job shops. Those 85 members do about 70 per cent of all the zinc die casting, 95 per cent of all the aluminum die casting and 100 per cent of the magnesium die casting. In the first six months of this year, job shops produced 53.9 per cent of their total output in zinc, 40.8 per cent in aluminum and 5.3 per cent in other metals such as magnesium, lead and copper. New Jersey Zinc Co. points out that the automotive industry is the largest civilian market for die castings, consuming about 50 per cent of all the zinc die castings produced and 25 per cent of all the aluminum. Home appliances are the second largest civilian market, taking about 20 per cent of all the zinc and 30 per cent of all the aluminum die castings turned out. Major military items that require die cast components include fuse and shell parts, personal equipment hardware and ordnance and aircraft instrument components.

Government regulations or no government regulations, die casters foresee a great future. H. H. Doehler, chairman of Doehler-Jarvis Corp., the world's largest producer and finisher of die castings, predicts that within the next ten years the industry will grow from its present quarter-of-a-billion-dollar annual output into a billion-dollar enterprise.

House Group Investigates CMP

Why were so many CMP third-quarter steel allotments turned down by the mills? That was a principal question put by the Burton subcommittee, House Small Business Com-

mittee, in opening its investigation as to what is wrong in steel (STEEL, Aug. 13, p. 45).

The answers—given by top NPA steel man Norman W. Foy, Richard F. Sentner, Herbert Johnson and Frank T. McCue—are these: Many consumers holding CMP tickets placed their allotments with more than one mill and failed to cancel the duplications; many failed to cancel DO-rated orders on which they had not been given CMP allotments; many holders of allotments placed more than the 35 per cent of a quarterly allotment which may be placed for a single month; a number of the mills lost production of finished products because of vacations and thus increased previous order carryovers.

The NPA spokesmen say the problem is not serious since failure of mills to accept some CMP tickets will not affect overall production in the metalworking industries. Where production is sharply reduced, they point out, it is not due to failure to accept steel orders, but to controls limiting the output of certain goods—particularly consumer-types.

The subcommittee wants to know if enough steel is being furnished and will continue to be furnished to keep the steel expansion on schedule. Yes, say the NPA steel men, subject to delays in acquiring machinery and equipment necessary to enable the new plants to operate when constructed. Steel for construction of steel plants has not come up for CMP allotments in some cases because all requirements schedules have not been submitted.

Next week the subcommittee will question a number of steel mill and steel warehouse men as to their experience under the CMP.

NPA Will Help

It may boost warehouse quotas, wipe out order duplication, to cut last quarter steel snarl

NPA SAYS it will help—but it yet doesn't know how—those steel consumers who have been unable to get mills to accept the fourth-quarter CMP allotments. (STEEL, Aug. 13, p. 45). It's too late to do anything about September.

Before it decides what to do, National Production Authority will try to get more data on just what has gone wrong. One fault probably is that consumers have duplicated tonnages among two or more producers. NPA will seek to wipe off those duplications.

Possibility — A move that NPA may make to relieve the congestion in the fourth period is to give more steel to warehouses. They're now getting 85 per cent of the tonnage they received in the base period, the first nine months of 1950, and they may win 95 or 100 per cent allotments of that base period for October, November and December. The reasoning for the increase is this: The majority of the CMP ticket-holders refused bookings for steel in the fourth quarter were small; more steel in the warehouses would take care of those smaller consumers. The idea is also to build up greater steel inventories throughout the country to take care of emergencies such as the Missouri-Kansas floods.

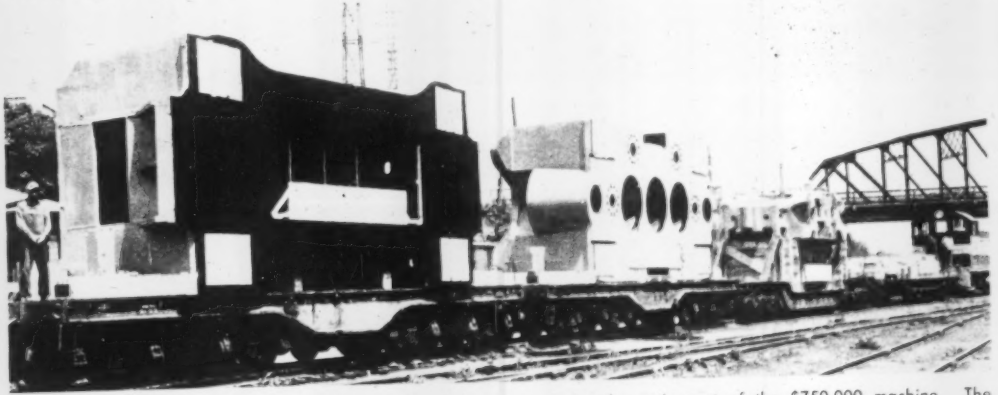
If the warehouses get 100 per cent allotments, they'll receive 75,000 tons more of carbon steel per month in the last three months than they are getting now. The current monthly carbon steel allotments of 425,000 tons would thus be increased to 500,000 tons.

One Hope NPA hopes that one remedy will be increased steel production in the fourth quarter. Information to date indicates that the tonnage involved in unaccepted CMP orders is a small percentage of the capacity for the quarter, so a boost in production might wipe out the deficit. If worse comes to worse, the agency could require the mills to take an overload for the fourth period, canceling out in the first quarter of next year what might be left of the overload. NPA has set Sept. 15 as its deadline when it must come up with some means of cutting the Gordian Knot in steel distribution.

In the meantime, spot assistance is taking care of quite a few cases where steel is needed for such critical items as machine tools, tools and dies. Requirements in these cases are generally small; one of the cases in which relief has been granted this week for September involves only 1500 pounds of bars. In those small cases warehouses have promised to fill the needs.

Quiet Talk has died down about setting up a priority within the CMP to take care of steel for machine tools and other vital machinery and equipment, and accessories and components for such machinery. The decision is that all these requirements must be taken care of under CMP allotments.

Apparently, there is no likelihood of NPA's Iron & Steel Division being given top responsibility for cutting the steel pie into CMP allocations. Under the system which evidently is to be continued, all claimant agencies report requirements to the Defense Production Administration



BIG SQUEEZE: This giant metalworking press—it weighs nearly 1375 tons altogether—has just completed a cross-country trip from Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., to Lockheed Aircraft Corp., Burbank, Calif. The three sections shown weigh 450 tons and comprise the main part of the $750,000 machine. The press exerts 8000 tons pressure, equivalent to the weight of a battle cruiser. Lockheed will use it to form integrally stiffened parts and large wing sections for airplanes from a single piece of metal. Die space is 30 by 10 feet

which turns them over to NPA's Iron & Steel Division for analysis as to feasibility of production. The Iron & Steel Division reviews the requirements with the claimants and attempts to bring them into balance with supply, and then makes recommendations as to final allocations. Dissenters may take their complaints to DPA's Program Adjustment Committee. If the Program Adjustment Committee is unable to resolve the claims in question, final determination and decision is made by DPA's Requirements Committee.

Depreciation Moratorium

A 60-day stoppage of most fast write-offs will permit a program reappraisal

THE 60-DAY moratorium that began Aug. 18 on fast amortization privileges for expanding companies finds most of the major metalworking applications already acted upon.

Mobilization Chief Charles E. Wilson says that during the 60-day stoppage "a review is to be made of the administrative procedures and of the criteria on which certificates of necessity for the tax write-offs are to be granted and percentages determined."

Complete Stop? He adds: "The extremely tight situation in the availability of critical materials such as structural steel makes it unlikely that new facility construction beyond that now planned can proceed for several months except for the most urgent projects."

A few exceptions to the moratorium have been made. They include fast write-offs for factories urgently needed to produce specific military finished products, for expansion of critical raw materials production, for facilities needed to "round out" vital projects already started and for facilities which don't require large amounts of critical materials.

Nearly $9 Billion As of Aug. 10, the government had authorized a total of nearly $8.9 billion in fast amortization benefits.

In the week ended Aug. 10, the largest certificates went to Kaiser Aluminum & Chemical Corp. One certificate permits Kaiser to write off 80 per cent of $75 million in five years for facilities to produce aluminum pig in New Orleans. A second certificate to Kaiser allows fast depreciation of 80 per cent of $16.5 million worth of facilities to produce alumina at Baton Rouge, La.

The second largest grant went to General Motors, authorizing a 75 per cent fast tax write-off on $37.5 million worth of defense plants.

RACKED AND STACKED: Finished brackets for Life-Line motors are held in pin-type racks on specially-built caster trucks at the Buffalo Works of Westinghouse Electric Corp. Each rack holds 300 brackets and can be moved to assembly area as needed

Lots of Money but Few Goods

People in the year ahead are going to have $5 million more to spend on goods and services than will be available to spend it on. This was forecast by the staff of the House-Senate Committee on the Economic Report. At present prices, personal consumption of goods and services can increase somewhat over the next 12 months and remain at this higher level through the following year, the report predicted.

GAO Approval in Renegotiation?

Under a bill passed by the Senate and awaiting House action, settlements with contractors under the new Renegotiation Act would not be final and binding until approved by the General Accounting Office. GAO is the agency so critical of renegotiation settlements of World War II contracts. Incidentally, White House spokesmen say that make-up of the new Renegotiation Board should be announced within the next week or two.

Machine Tool Builders Get Green Light

NPA may soon double certifications of tool pool orders. General Services Administration will be ready to help finance them with more money but spread thinner

NPA WILL soon sharply increase—perhaps even double—certifications of machine tool pool orders to the General Services Administration. Those certifications now come to $400 million. Main determining factor in the size of the pool certifications will be the size of the increase in the number of air groups voted.

Ready and Able—GSA will be able to handle any total amount of tool pool orders NPA may certify—even more than $1 billion—because of two liberalizing actions. GSA got more money for the program, is authorized to spread it thinner.

By the action of the Bureau of the Budget, it has been allowed an additional $200 million for pool orders, making a total of $340 million for that purpose to date. Previously GSA has been operating its machine tool pool business on a "gross liability basis" of 90 per cent—meaning that it had to have $90 on hand for every $100 of pool orders placed. Now, by authority of the Defense Production Act extension, it is operating on a "prudent reserve" basis of 30 per cent.

The 30 per cent, a GSA spokesman explained to STEEL, is largely to cover advance payments of 30 per cent which may be made to machine tool builders who accept pool orders and request advances. GSA expects to pay for only a very limited number of tools included in the pool orders, since the tools are to be delivered to contractors and paid for by the latter. GSA is to pay only for the pool order tools not delivered to contractors, and these should constitute a negligible portion of the total pool.

A Lot of Talk—A lot of discussion is going on in the GSA—also in the DPA—about machine tool builders' complaints regarding the 4 per cent interest charged on the money in the 30 per cent advance payments.

Actually, GSA says, those payments are loans which will have to be repaid when the machine tool builder collects from the contractors to whom he delivers the tools. Inasmuch as it is 2 per cent Treasury money which GSA hands out in these loans, and inasmuch as the costs of conducting and administering the activity come to around 2 per cent, there is no recourse except to charge 4 per cent interest. That is what GSA people say. However, if DPA and NPA officials determine that some modification in the present terms is necessary to obtain universal acceptance of ma-

chine tool pool orders, some arrangement acceptable to the tool builders may result.

Despite the dissatisfaction machine tool builders have expressed over the price ceiling order and the 4 per cent interest rate, the fact remains that 40 per cent of the tool orders placed so far have been accepted. Here is the record to date: 44 orders placed for 9779 tools involving $161 million; 5 orders rejected for 1323 tools involving $16 million; 22 orders under consideration by builders for 4764 tools involving $92 million; 17 orders accepted for 3692 tools involving $52 million.

Misunderstood—GSA officials believe there has been a lot of misunderstanding or misrepresentation about the terms under which 30 per cent advance payments are obtained.

It has been widely charged that to qualify for a 30 per cent advance payment, a machine tool builder has to take a "pauper's oath." This, GSA men say, is not true.

To get an advance payment, a machine tool builder with a pool order must bring in some kind of proof that he has been unable to get a loan from a private source for financing defence expansion on a satisfactory basis as to interest, collateral, etc.; a letter from the machine tool builder's bank stating inability to grant a satisfactory loan in the particular case is sufficient. This, GSA men say, is a far cry from a pauper's oath.

ABUSED: Designed for a 30,000-pound load, this 40-foot prestressed concrete beam did not fail until a test load of 130,000 pounds was applied to it. Reinforcing cables, applied on the outside of the concrete member, remained intact when the beam split lengthwise. The Austin Co. conducted the tests to explore potentialities of prestressed concrete, which requires only about 20 to 25 per cent as much steel as comparable structural steel and reinforced concrete buildings

Vacation Time? Not for Steel Production!

THE METALWORKING industry's heavy demand for materials brought about phenomenal production of steel in July.

The American Iron & Steel Institute reports that whereas output of steel ordinarily declines in July from vacations and hot weather the production during July of this year was 39,000 tons larger than that in June. July output of steel for ingots and castings was 8,696,000 net tons. This is 613,000 tons over the production in July, 1950 (see table below).

Not only did the steel industry have to overcome effects of vacations and hot weather in July this year but it faced a stringent supply of scrap.

Big output of steel in July helped push production for the first seven months to a record, almost 60,968,000 net tons. That total is only about three weeks' production short of the amount turned out in all of 1946, the institute points out.

The output in the first seven months of 1951 was 5.7 million tons higher than that of the corresponding period of 1950.

Although the steel industry chalked up a good production for July its rate of operations, 98.4 per cent of capacity, was next to the lowest monthly rate this year. Tonnage turned out was larger, however, than that of some other months, because July was a 31-day month.

	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly	Number
1951	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	production (Net tons)	of weeks in months
January	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
February	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
March	8,059,625	104.2	408,926	85.6	602,504	93.9	9,071,055	102.4	2,047,642	4.43
1st Quar.	22,840,119	101.7	1,166,763	84.2	1,673,041	89.8	25,679,923	99.9	1,996,884	12.86
April	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
May	8,071,270	104.3	408,650	85.6	614,579	95.7	9,094,499	102.7	2,052,934	4.43
*June	7,667,811	102.3	403,001	87.1	586,148	94.3	8,656,960	100.9	2,017,939	4.29
*2nd Quar.	23,596,242	103.9	1,204,123	85.9	1,791,615	95.0	26,591,980	102.2	2,043,965	13.01
*1st 6 mo.	46,436,361	102.8	2,370,886	85.0	3,464,656	92.4	52,271,903	101.1	2,020,561	25.87
†July	7,710,000	99.9	412,000	86.5	574,000	89.6	8,695,000	98.4	1,957,000	4.42
1950										
1st 6 mo.	42,175,530	97.7	2,152,402	78.3	2,846,660	83.5	47,174,592	95.7	1,823,525	25.87
July	7,224,306	97.0	380,317	79.8	478,299	79.7	8,082,922	94.8	1,828,715	4.42

Note—The percentages of capacity operated in 1951 are calculated on weekly capacities of 1,746,337 net tons open-hearth, 107,806 net tons bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951, as follows: Open-hearth 91,054,020 net tons; bessemer 5,621,000 net tons, electric 7,554,630 net tons; total 104,229,650 net tons.
* Revised. † Preliminary figures, subject to revision.

Leader: Cold-Rolled Sheets

Biggest product tonnagewise in mill shipments of steel during the first half of 1951 was cold-rolled sheets, the American Iron & Steel Institute reports.

Next was hot-rolled bars (including light shapes); then came hot-rolled sheets; and in fourth and fifth places were plates and heavy structural shapes, respectively. These five products accounted for 50.7 per cent of the total mill shipments of steel in the first half.

Breakdowns of percentages are: Cold-rolled sheets, 12.7; hot-rolled bars, 11.2; hot-rolled sheets, 10.9; plates, 9.7; and heavy structural shapes, 6.2.

Mill shipments of finished steel in the first half of the year totaled 40,005,921 net tons. June shipments were 6,645,897 tons, a record for any 30-day month, and higher than in any month prior to 1951.

Although plates were in fourth place percentagewise in the first half of 1951, they were up 50 per cent over the corresponding period of last year. This was by far the greatest increase in any major product, and indicates the changed character in production and demand during the defense build-up. Also reflecting effects of the defense economy, shipments of stainless and other alloy steels were approximately one-third larger in the first half of 1951 than in the first half of 1950.

Where the Steel Went

The amount of steel provided for direct defense purposes rose sharply in the first half of this year, but most of the 5.4 million tons increase in steel shipments, as compared with the first half of 1950, went to industries that are always large consumers of steel.

Reporting on where the steel went, the American Iron & Steel Institute pointed out that warehouses, which serve all kinds of industry, but mainly small business, were the No. 1 customers of the steel industry in the first half of '51. Shipments to warehouses totaled more than 7 million tons, 18.1 per cent of the total mill shipments.

Second biggest customer was the

automotive industry. It received mill shipments of 6,968,000 tons, 17.8 per cent of all steel, compared with 20.9 per cent in the first half of 1950.

Makers of aircraft, guns, tanks and similar products received nearly half a million tons more steel in the first half of this year than in the corresponding part of 1950. In June, after several months of increases, direct shipments of steel for manufacture of ordnance and other military goods were nearly 105,000 net tons, almost 20 times as much as a year earlier.

Mill shipments of finished steel in the first half of 1951 were a record high of 40,005,921 net tons. This is 5,442,000 tons or 15 per cent greater than shipments in the first half of 1950.

NPA Needs Two Men Urgently

Two steel men are urgently needed by NPA's Engine and Turbine Division—one familiar with requirements of the pipe fabricating industry and the other with those of the tank fabricating industry.

If you are interested, get in touch with E. J. Hand, deputy director of the division, 3H13 New GAO Bldg., Washington.

Missing Link in Chains

It's the nickel shortage that is sorely plaguing the makers of power transmission chain

A PROBLEM of a missing link is plaguing the makers of power transmission chain.

That missing link is nickel. The manufacturers depend heavily on alloy steels using nickel. Now that the shortage of nickel and attendant government limitations on the use of it have put a crimp in alloy steel production the nickel is sorely missed.

Resulting substitutions in steels appear to have been carried even beyond the point where quality and performance of products can be assured and maintained. Not even boron-treated steels solve the problem.

At Road's End — Prior to Korea chain makers had gone as far as they could reasonably in adopting the leaner alloy steels. Consequently, further reduction in use of nickel has hurt. Boron-treated steels have been resorted to but while these provide the requisite hardness characteristics they are believed to be lacking in endurance and fatigue properties. Machine designers provide no opportunity for increase in chain sizes. Consequently chain makers fear possibility of failure from use of inadequate steel.

Electric furnace alloy steels in the form of heavy strip, flats, rounds and wire are the principal products used by chain manufacturers. Not only are these in critically short supply because of the nickel limitation order but rolling tolerances are narrow and prove to be more unattractive to mills than less exacting rollings. Forging grade steel for sprockets also is short.

Order backlogs range from 3 to 8 months with deliveries in the same bracket, depending upon chain type. Military requirements fall chiefly in the standard types although the tendency toward specials is growing. Among specials are such small chain as for aircraft controls. Tank tread definitely is a special product.

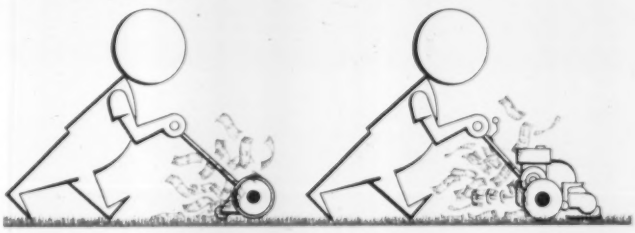
Three principal types of chain used for power transmission are finished steel roller chain, steel bar link chain and cast malleable chain. Some 12 to 15 companies account for the bulk.

Stick to Chain Making — For the most part, power transmission chain manufacturers confine their activities to their product line and fully utilize their facilities to meet the heavy demand. Acceptance of war contracts for other products is therefore at a minimum. Among the exceptions are sprockets for tanks. Direct military use of power transmission chain still is estimated as from 3 to 10 per cent of total output.

Indications are 1951 output will range from 20 per cent to 100 per cent over that in 1950, depending upon the type of chain considered.

Getting Bigger — Since end of World War II, power transmission chain makers have expanded their production facilities sharply. More expansion is under way. Recent increased production is being accomplished largely through longer working hours, and in some cases by adding second and third shifts, where workers are available. Pricing of power transmission chain has been no serious obstacle yet, but the breakthrough point of profit is being approached.

Lawn Mower Makers Cut Wide Sales Swath



LETTING no grass grow under the feet of the public is the job of some 200 metalworking companies comprising the lawn mower industry.

Those companies—about a dozen of them turn out the bulk of today's hand and power units—have rolled along at a merry sales clip in the lush postwar years. And they think their market far from the saturation point.

They can sell all that they make, but are subject to the usual restrictions imposed on consumer durable goods. At present they are producing at about 70 per cent of 1950's first-half rate.

Controversy—Dollar volume of the industry shows wide divergence in estimates of the makers themselves: Anywhere from $75 million to $150 million. The industry has no trade association and there are no government figures on the subject. Lawn mower manufacturers say the industry uses between 60,000 and 85,000 tons of metal yearly.

Bulk of present production is still the hand unit, but the tide appears to be rising in favor of power models, the first of which made its appearance about 1902. Power units already account for more of the sales dollar than hand units. Prior to 1950, keenest competition was in hand mowers, but with the increasing number and types of power models on the market, there is a trend in the other direction. Some special attachments for year-round use of lawn mowers are considered impractical by a majority of manufacturers; remote control devices, a novelty.

Seasonal Sales—Normally the industry sells 80 per cent of its annual volume in the first six months of the year. This creates serious inventory and storage problems and causes some producers to shut down during the summer months. Orders are booked starting in late summer for fall-winter shipment. Liberal payment terms are allowed to speed early shipments and slice plant inventory.

Most lawn mower manufacturers

turn out the entire unit themselves with the exception of power plants which are bought in package form almost exclusively. Larger-size firms subcontract as little as 10 per cent of the mower parts. Quite a few operate their own foundries which help diversify their defense operations. Equipped mainly for light machining and assembly operations, producers have taken on upwards of 30 per cent of capacity in defense work. They are keeping eyes peeled for essential subcontract work down their alley in case they are forced to cut back sharply.

Power mowers were once used only in cemeteries, parks and estates. Their rise on the public's popularity list can be attributed to a trend towards suburban homes and more spacious lots. Demand for both hand and power mowers should stay high: With every new home going up, there is a customer to be sold.

Electrochemists Plan Fall Session

First Palladium Medal award given by the Electrochemical Society Inc. goes to Dr. Carl Wagner, visiting professor of metallurgy at Massachusetts Institute of Technology. The Palladium Medal was established in 1950 by the corrosion division of the society to recognize outstanding contributions to corrosion research and fundamental electrochemistry.

Dr. Wagner will receive the medal at the society's 100th meeting, the 1951 fall convention, Oct. 9-12, at the Statler Hotel in Detroit. Also planned for the four-day session are symposia on corrosion, electrodeposition and electro-organic chemistry. Roundtables scheduled include three on screen engineering, power supply and requirements for the electrochemical industries and primary and secondary batteries.

U.S. Radiator Buys Chicago Plant

United States Radiator Corp. acquired the Highway Steel Products Co. plant at Chicago Heights, Ill., for immediate use in defense production. Facilities in the Chicago plant include welding equipment, heavy presses for stamping and forming and a modern finishing department for bonderizing and enameling. U. S. Radiator has several Air Force contracts to make steel and aluminum landing mat.

Magnesium Plant Reactivated

After six years of idleness following World War II, Diamond Magnesium Co.'s plant in Painesville, O., again is making metal.

The first ingots of magnesium were poured at the reactivated war plant on July 27. Every effort will be made to have the plant at full production by the end of 1951, says Frank W. Jarvis, president. Built by the government for $16 million, the plant produced at an annual rate of 18,000 tons during World War II.

Last December, Diamond Magnesium, a wholly-owned subsidiary of Diamond Alkali, Cleveland, was requested by the General Services Administration to "de-mothball" the plant and resume production. The H. K. Ferguson Company of Cleveland took over the big task of rehabilitation.

NIGHT WATCHMAN: Assembly lines are now rolling out these F-89 jet interceptors in undisclosed numbers. The plane has a radar eye in its nose to expose raiders attempting to reach the coast at night or through protective fog or clouds

Navy Lists Supplier Needs

Navy Material Inspection Service is now listing components in short supply that are required by contractors for completing some projects already in progress. The lists, designed to aid small business as well as assist prime contractors, are available for reference at any of the inspection service's 80 offices.

The listing names the prime contractor, gives the subcontracted item needed and its specifications. Items to be procured are broken down into these categories: Electronic and electrical materiel, fabricated metals, forgings, castings, paper and wooden products and miscellaneous.

New York Has 18.3 Per Cent of All Defense Dollars

NEW YORK tops all other states in dollar volume of government prime contract awards in the period July 1, 1950 May 31, 1951. The Defense Department's latest report by states covers $21,019,955,000 of the $23,711,286,000 awarded in the period.

New York leads the list with contracts amounting to $3,843,279,000, or 18.3 per cent of the total. California is second with $2,820,018,000, or 13.4 per cent. Following were these states: Michigan, $1,629,660,000; Ohio, $1,449,442,000; Connecticut, $1,228,090,000; Illinois, $1,037,338,000; New Jersey, $989,348,000; Pennsylvania, $931,867,000.

Contracts received recently by the Clyde Porcelain Steel Corp., Clyde, O., may provide supplier opportunities by early fall. The company will make tank door assemblies for Ford Motor Co. and Fisher Body Division of General Motors Corp.

Among Ordnance awards, a subcontractable package deal involving three sparate contracts went to Bryant Heater Division of Affiliated Gas Equipment Inc., Cleveland, for $2,222,000. The division will make 1225 track spindle assemblies for $104,000; 139,105 shells for $970,000; and 7010 truck arm and wheel assemblies for $1,148,000.

Briggs Motor Co. will supply wings, flaps, elevators, rudders, fins, ailerons, bomb doors and landing wheel doors for Boeing's new eight-jet bomber.

Other contracts in excess of $250,000, follow:

PRODUCT	CONTRACTOR
Fire Truck Bodies	Howe Fire Apparatus Co., Anderson, Ind.
Fire Trucks	General Detroit Corp., Detroit Ward LaFrance Truck Corp., Elmira, N. Y. General Fire Truck Co., Detroit Ingersoll-Rand Co., New York
Air Compressor Parts	John Reiner & Co., Long Island City, N. Y.
Centrifugal Pumps (2 contracts exceeding $500,000)	Link Aviation Inc., Binghamton, N. Y.
Aircraft Trainers, Flexible Gunnery	Minneapolis Honeywell Regulator Co., Minneapolis
Automatic Pilot Components	American Airmotive Corp., Miami Springs, Fla.
Packard Merlin Engine Parts	Continental Motors Corp., Muskegon, Mich.
Engines (4 contracts exceeding $1 million)	Canadian Commercial Corp., Washington
Procurement of Twin-Engine Pilot Trainers	Gilfillan Bros. Inc., Los Angeles
Radar Sets	
Generator Sets (2 contracts exceeding $500,000)	The Buda Co., Harvey, Ill. O'Brien Diesel Electric Corp., Philadelphia
Generator Sets	Bolinders Co. Inc., New York Hill Diesel Engine Corp., Lansing, Mich.
Generators, gasoline engine driven	Master Vibrator Co., Dayton, O.
Electric Lighting Kits	Master Vibrator Co., Dayton, O.
Radio Sets	Jay Mfg. Co., St. Louis
Radio Receivers	Lavoie Laboratories Inc., Morganville, N. J.
Inverters	Remler Co. Ltd., San Francisco Schuttig & Co. Inc., Washington National Pneumatic Co., Boston

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

EXPORT MRO—NPA Order M-79 issued Aug. 9, 1951, establishes quarterly quotas for export of maintenance, repair and operating supplies to non-Communist countries.

FERROALLOYS—NPA Order M-80, issued Aug. 15, 1951, places 14 ferroalloying materials and ferroalloy products under centralized control, with six of the number being put under complete allocation. This order plus seven schedules issued in conjunction with it supersedes regulation of the alloys and alloy products under eight separate orders.

BISMUTH—Amendment of Aug. 10, 1951, of NPA Order M-48 permits increased use of bismuth in the civilian economy. Beginning Sept. 1, a person will be permitted to use in any month up to 100 per cent of his average monthly use of bismuth metal or alloys during the first six months of 1950, or 100 pounds, whichever is greater. Users have been limited to 60 per cent of their average monthly consumption during the base period. Use limitations of M-48 caused consumption of bismuth to decline sharply during the second quarter while producers' inventories increased substantially. Liberalization of use restrictions of M-48 was necessary to maintain the present high level of production and imports.

CANS—Amendment of Aug. 7, 1951, of NPA Order M-25 restricts governments use of heavier tin cans to specific food products. The amendment was effective Aug. 7, 1951.

COPPER—To facilitate rehabilitation of businesses and industries hit by the Missouri-Kansas-Oklahoma flood, the NPA on Aug. 10, 1951, issued Direction 1 to NPA Order M-11 to provide for adequate distributor inventories of brass mill products and copper wire mill products.

FOREIGN PETROLEUM — Amendment of Aug. 15, 1951, of NPA Order M-46A provides a priorities assistance system to help petroleum operators get materials for foreign operations.

TUNGSTEN, MOLYBDENUM — NPA Order M-81 issued Aug. 15, 1951, separates the control and allocation of pure tungsten and pure molybdenum from regulations controlling other forms of the two metals. Problems involved in allocating the pure forms are radically different from those in allocating ferrotungsten and ferromolybdenum.

Controlled Materials Plan

MRO—Direction 2 to CMP Reg. 5 (MRO) provides special help to those stricken by the Missouri-Kansas-Oklahoma flood and certain other disasters. Direction 2, issued Aug. 10, 1951, enables any business firm, government agency or public or private institution to get material for repair or replacement of equipment and supplies damaged or destroyed by disasters.

CONSTRUCTION — Direction 2 to CMP Reg. 6 (Construction) provides special help to those stricken by the Missouri-Kansas-Oklahoma flood and certain other disasters. Direction 2, issued Aug. 10, 1951, provides means for getting materials needed in reconstruction or repair of most types of buildings.

STEEL DISTRIBUTORS — Direction 3 to CMP Reg. 6 (Steel Distributors) provides special help to the Missouri-Kansas-Oklahoma flood area. This direction, issued Aug. 10, 1951, requires steel producers to ship during August and September to steel producers serving the flood area 130 per cent of the base period quota rather than the 85 per cent limit set for other areas.

MRO—Amendment of Aug. 10, 1951, of CMP Reg. 5 prohibits manufacturers from flooding the market with orders for maintenance, repair and operating supplies at the beginning of each quarter. Manufacturers will not be permitted to order or receive more than 40 per cent of their quarterly quotas of MRO items during the first month of any quarter. Manufacturers who have placed orders totaling more than 40 per cent of their fourth quarter, 1951, quotas must cancel the excess amounts.

NPA Delegations

NACA—NPA Delegation 3 which gave the National Advisory Committee for Aeronautics the right to apply DO ratings and allotment numbers was revoked Aug. 14, 1951, by NPA. This delegation had become obsolete because these rights are granted to NACA in NPA Delegation 1, as amended June 30 1951.

COAST GUARD—NPA Delegation 4 which gave the Coast Guard the right to apply DO ratings and allotment numbers was revoked Aug. 14, 1951, by NPA. This delegation had become obsolete because these rights are granted to the Coast Guard in NPA Delegation 1, as amended June 30, 1951.

Price Regulations

MANUFACTURERS—Amendment 21 of Ceiling Price Regulation 22 delays for an indefinite time the effective date of CPR 22 (manufacturers' general ceiling price regulation). Amendment 21 was issued Aug. 9, 1951.

MACHINERY MAKERS—Amendment 7 of Ceiling Price Regulation 30 delays for an indefinite time the effective date of CPR 30 (machinery and related manufactured goods). Amendment 7 was issued Aug. 9, 1951.

STRATEGIC METALS — Amendment 4 of General Overriding Regulation 9 exempts from price control several industrial ores and materials having critical and strategic importance to the defense program. They are: Raw asbestos, beryl ores, chrome ores, cobalt ores and metal, columbite-tantalite ores, natural graphite, kyanite and related ores, manganese ores and acid grade fluorspar. There is a critical shortage of these raw materials and it was considered necessary to remove them from price control to avoid any curtailment in the supply from foreign sources. Sales of domestic mercury are also exempted from price control. Amendment 4 was effective Aug. 10, 1951.

SECONDARY ALUMINUM INGOT—Supplementary Regulation 1 to Ceiling Price Regulation 54 (Aluminum Scrap and Secondary Aluminum Ingot) authorizes producers of secondary aluminum ingot in the Midwest flood area to apply for permission to make deliveries at GCPR ceiling prices after Aug. 13, 1951. CPR 54 had set price ceilings on secondary aluminum ingot at levels 30 to 50 per cent below GCPR prices but permitted sellers to deliver at GCPR prices until Aug. 13. The supplementary regulation was issued Aug. 13.

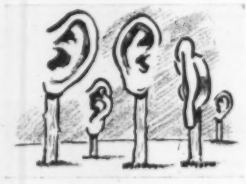
ECONOMIC LIFT: A civilian purchasing officer for the Japan Logistical Command inspects stoves bought by his agency from a Japanese manufacturer. The United States spent almost a billion dollars with Japanese industry in the last year

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

STEEL CASTINGS
—the demand is terrific

DR. CONDON QUITS
—financial sacrifice too great



LISTENING POSTS ABROAD
—now on a permanent basis

GOLF CLUBS
—made with molded heads

LATEST BOTTLENECKS plugging up the defense program are in castings. Steel castings—especially in large machinery housings and cast armor plate — are tight as a drum. Malleable castings, too, are tight all along the line; the shortage is getting acute. Gray iron castings are easy except for large machinery castings where there is little if any idle capacity.

Biggest pressure ahead is for steel castings: NPA officials think the industry may eventually be confronted with double the present demand. For one thing, the Air Force expansion will swell the demand for heavy presses (many require beds of over 50 tons). Too, the East Chicago plant where American Steel Foundries is installing special heat treating facilities, large cranes and other facilities will not produce nearly all the cast steel armor plate for defense needs. Much of the demand will be filled from privately owned plants.

Steel foundrymen are urged to contact the Tank-Automotive Center, 1501 Beard St., Detroit (not the Detroit Tank Arsenal), to get guidance in approaching contractors for subcontracts.

Those Government Salaries . . .

No longer able to afford the "severe financial sacrifice" as director of the National Bureau of Standards (his salary was $14,000), Dr. Edward U. Condon resigned to become the director of Corning Glass Co.'s research and development department. Described by the House Un-American Activities Committee as "one of the weakest links in our atomic security" in 1948, Dr. Condon vigorously denied the charge and demanded he be given a hearing that was never called.

Dr. Condon was director of research for Westinghouse before going into government service.

Listening Posts: A Reality . . .

The idea of establishing scientific listening posts abroad (it was tried out in an exploratory way several years ago by the appointment of a science mission as part of our embassy in London) was adopted on a permanent basis by the State Department.

Dr. Joseph B. Koepfli, on leave from the California Institute of Technology, was appointed Science Adviser to head up the show for the State Department. Already five United States scientists were selected to serve as scientific attaches in our London, Stockholm and Bern embassies. Similar arrangements will be made later on at Paris and other cities. Initial appointees include fundamental scientists; later appointments will include metallurgical, electrical, mechanical, chemical and other types of engineers.

The plan calls for dissemination by the Commerce Department's Office of Technical Services of the information gathered by the scientific attaches. If you're interested in the development of the program, write or visit Dr. Koepfli in Washington.

Opportunities, Possibilities . . .

Well worth your while: A perusal of the "Register of Patents Available for Licensing or Sale," particularly in the July 10, 17, 24 and 31 issues of the Patent Office's *Official Gazette*. Over a thousand patents of General Electric Co. were listed for use on reasonable terms. They include: Nonmetallic gear wheels, wiring ducts, golf clubs with molded heads, circuit breakers and interrupters, electric motors, powdered iron magnetic cores and a host of others that might prove to be profitable.

The patent office also announced 11 patents were made available for free use by the public through dedication by Solar Aircraft Co., San Diego, Calif. Among them: A machine for die-forming sheet material in which a press and hammer action are combined in a single device so a pressing action may be initially performed followed by a hammering action to complete the operation; a centrifugal casting machine for forming exhaust parts for airplane engines; an aircraft combustion heater with controls that eliminate the need for superchargers; a machine for bending thin-wall tubes. Lists of the patents and abstracts can be had from Register of Patents section, U. S. Patent Office, Washington 25.

Chief of Industry Branch . . .

Paul W. Norris was promoted to the chief of the newly created Industry Branch, Metalworking Equipment Division, NPA. He is on leave from Denison Engineering Co., Columbus, O. The 12 sections over which he has supervision are concerned with: Abrasive Products, Cutting Tools, Gages & Precision Machining Instruments, Welding, Industrial Heating, Foundry Equipment & Supplies, Machine Tool Cutting, Machine Tool Forming, Wire Drawing & Rolling Mill Equipment, Light Power Driven Equipment, Machine Tool Attachments & Accessories, and Tools, Dies, Jigs & Fixtures.

unusual hardening jobs

are run of the mill for flamatic

For instance, hardening tooth profiles (not the roots) of 24-inch OD starter ring gears—and holding flatness within .005", roundness within .003" to eliminate corrective operations—was a tough job that became a "set-up" for Flamatic hardening with electronic temperature control. Initial success led user to buy two additional machines now handling 35 different sizes of ring gears.

Specs for the automotive transmission cam (left) called for hardening six internal lobes uniformly to a precise hardness and pattern. Flamatic engineers developed a special fixture to harden all six simultaneously, on a high production basis, with virtually no rejects.

Cutters for pliers, snips, etc., have been selectively surface hardened by Flamatic—faster, more uniformly, and to higher "physicals" than previously attained. Applied heat engineering in the Cincinnati Flamatic Laboratory may help you apply specified hardness to selected areas of your parts... Write for new catalog. Publication No. M-1724.

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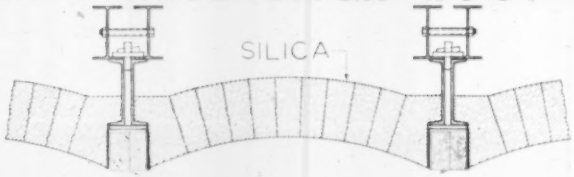
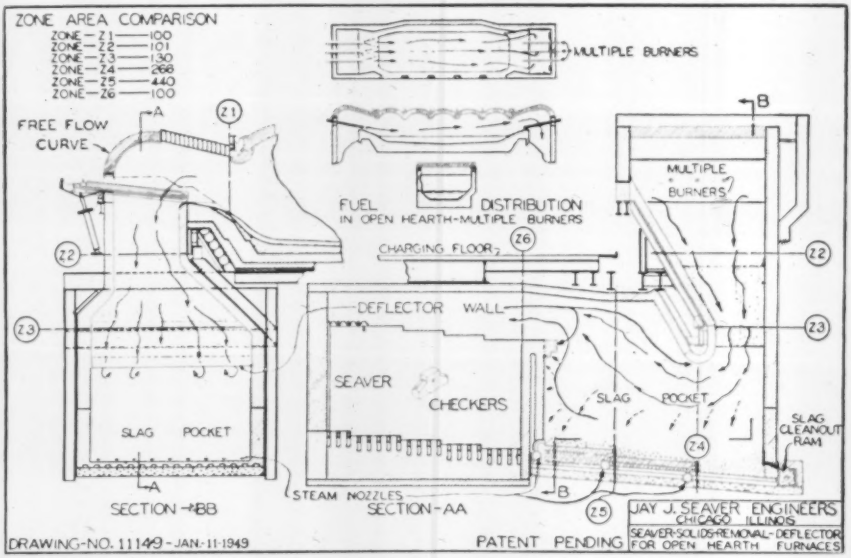


Advantages of Basic Roof at Price of Silica



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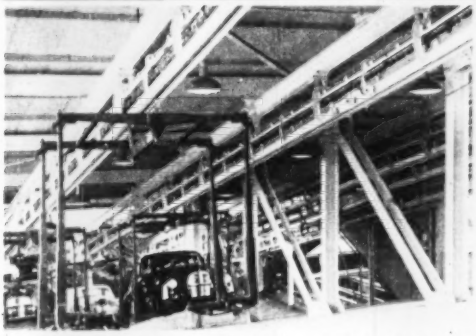
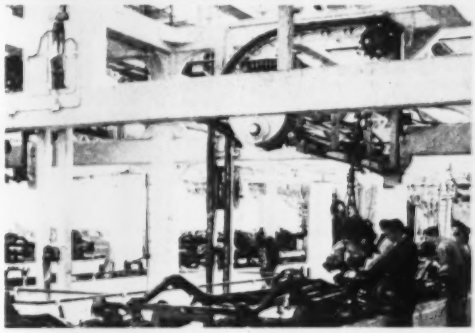
British Austin Co. Goes 'Automatic' in New Assembly Plant



Austin Bodies Enter Main Tunnel from Loading Station



Engines Are Automatically Lowered Into Chassis Frame

ARE THE British still addicted to the hand craftsman techniques of industrial production? Not in the new auto assembly plant of Austin Co.

At Austin's Longbridge works, innovations in automotive assembling are being tried that may profoundly influence Britain's mass production techniques.

Use the Terrain—Austin has made use of the natural terrain in its layout. A totally enclosed bridge was built from a lower building to connect with a main tunnel running under the entire frontage of the new factory. The tunnel houses a mass of overhead chain conveyors which carry in procession engines, axles and complete bodies to underground sidings where, according to type, they are automatically directed to one of three sets of delivery conveyors.

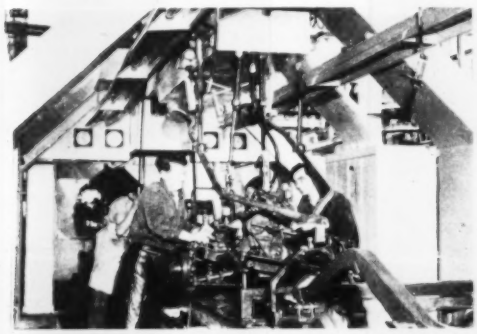
There are more than 16 miles of conveyors in the tunnel and assembly halls, with a total capacity that exceeds 700 tons. All conveyors, together with tracks, hoists and electric tools are joined by some 100 miles of cable direct to a control room. Should any fault occur in the system, its location is immediately indicated on panels by colored buttons.

Up Above—The autos are assembled on three assembly tracks—space has been left for a fourth if needed—that extend 250 yards down the length of the building. The tracks, enclosed on either side, start among banks of parts that contain about 750,000 chassis components. The requisite number of parts is placed on the track unit sets to be available for assembly as the chassis moves forward past the axle and engine automatic delivery lifts.

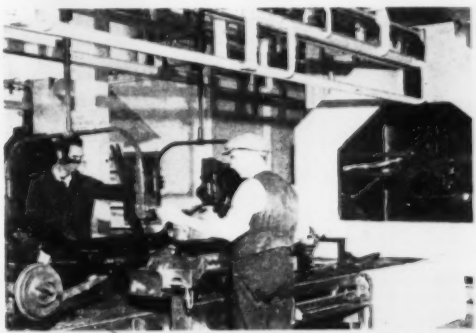
Half way down the tracks are electrostatic spray booths where chassis receive a coating of protective paint. After passing through the drying ovens, the chassis are lowered to the track and enter the lubrication station, first of its kind in Europe and perhaps the world. Three gantrys span the three assembly tracks and, along each, travels a carriage which carries lubricating hoses moving at the same speed as the track beneath to oil engine, transmission and axle.

The lubrication system was installed by C. C. Wakefield & Co. Ltd.

Fitted Up—After passing through the lubrication bays, the chassis then continue to the body mounting station where the completely trimmed and polished bodies meet them. As each car in embryo begins its journey down the assembly line, relevant details of components are transmitted to a central office electrically.



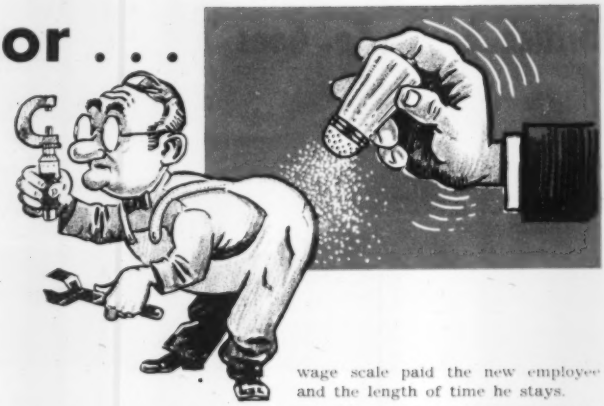
Lubrication of Chassis Is Carried Out Under Pressure



Chassis and Engine Ready for Electrostatic Spray Booth

Skilled Labor . . .

How To Get And Hold It



H. G. BURR INC., a Pittsburgh engineering firm, took employees and their families on a one-week trip to Bermuda this summer—with expenses split 50-50 by the company and the employees. Burr is giving extensive publicity to the fact that it will do the same thing next summer but on an even grander scale—two weeks in Paris next year with expenses half and half.

You may not be offering Paris vacations, but the odds are that you, too, have a problem of skilled workers, how to get them and how to keep them. The procurement of semiskilled and unskilled labor is not yet a serious problem. In Detroit where conversion unemployment is the severest, the semi and unskilled have been laid off freely, but the trained workmen are being carried along wherever possible.

What To Do?—If you're not in the position to offer deluxe vacations to get and hold employees, what can you do? Here are the four most commonly used—and effective—recruiting techniques employed by metalworking companies:

Newspaper Advertising. It's still probably the best way, but your ads will draw no one except sweepers if they aren't well written. Get your advertising department or agency to sweat over the phrasing. Out-of-town newspaper advertising is also effective, but it involves a lot of headaches. You will likely have to worry with housing if out-of-towners are hired.

Contact with Schools and Colleges. For both clerical and skilled factory help these schools can be labor gold mines for you. It's well to nurture relations with a few.

Employment Agencies. United States Employment Service, state bureaus and reliable private agencies are all helpful, but remember that all such groups have fewer people on their lists in these times than when the labor supply is freer.

Employees' Word-of-Mouth Recruiting. Many companies find this the best means of all because such a high percentage of the prospects brought in are acceptable. A few firms have gone so far as to offer a bounty to the employee recruiter for everyone he brings in that is hired. The bounty varies according to the wage scale paid the new employee and the length of time he stays.

There are many other ways to recruit skilled labor, but none is in as common use as the four already mentioned. One technique, indirect, is to hire the semiskilled or unskilled person and train him yourself. Alas, most World War II training programs have been disbanded. The relatively few companies that still have them are cashing in, but the majority of the many firms that dropped them are not yet desperate enough to start again. Radio and television advertising for help is used sometimes, but many personnel men doubt its effectiveness. Ads on public vehicles, on billboards, on matchbook covers have all been used. A few companies keep in touch with organizations that place D.P.'s from Europe.

Tough Job—So, you have managed to hire a few people. Associated Industries of Cleveland points out that an even more difficult task may be to hang on to them. The Labor Department's Bureau of Employment Security says there were more job shifts in the 12 months after Korea than at any previous time since the end of World War II. More than 14 million job placements of farm and nonfarm workers were made by public employment services during the fiscal year ended June 30, 1951.

You may not be concerned with

SOME of the answers to getting and keeping manpower are simple yet effective: Getting bus service direct to the plant gate, providing a good place to eat, keeping rest and washrooms neat and clean, arranging an employee recreation program. There are many more, of course, and some of them are neither paternalistic nor expensive in view of the dividends paid.

PHRASE YOUR AD COPY WELL

PUBLICIZE YOUR LABOR PROGRAM

all the points in the following checklist, but if you have 80 to 90 per cent of them covered, rest assured that your problems of keeping skilled workmen once you get them will be kept to the minimum:

1. Have you defense contracts? Your skilled help will be restive if you don't, for they'll reason that you aren't well prepared to exist in the garrison state shaping up.

2. Have you a formal plan to recognize employee tenure anniversaries as they turn up? Letters from the president every year to employees with 20 or more years of service are helpful. Those letters should point out that the company hung on to its men even during the depression, that it will continue to look after is employees from now on no matter what develops.

3. Do you know thoroughly the background and skills of all your employees with five or more years of

RECOGNIZE ANNIVERSARIES

service? A man temporarily not needed in sales may have worked for a while 5 years ago as a lathe operator. Complete knowledge may uncover unsuspected skills and also keep a competent employee on your payroll but in a different job.

4. Do you play hob with seniority in your plant? Seniority may be a headache at times, but all in all there are good arguments for its observance. Whatever your views about seniority, the fact remains that observance, within reason, helps to keep employees.

5. Do you have and do you publicize a merit rating and evaluation program to upgrade employees in your plant? A good program, well advertised, is one of the best lures to keep competent workers.

6. Is your wage pattern under that of other companies in your industry and in your community? Expect trouble if the answer is "yes."

7. Do you have a wage incentive plan? If you can work it out under wage stabilization rules, such a program should be a help.

8. Do you have adequate parking space, lockers, toilets, washrooms and dispensaries? Those apparently are minor considerations but they loom up large when an employee is toying with the idea of going over to XYZ Metalworking Co.

9. What about eating facilities? Is your cafeteria adequate or must your people makeshift in neighborhood restaurants? Is there some uncluttered, clean place where people who bring their lunches can eat? More than one company has kept employees because it operated a cafeteria serving food at or slightly below cost.

10. What about living accommodations within reasonable distance of your plant? Do you have anyone who can help with housing problems? That's a service that could pay dividends. Are the schools, hospitals, stores and amusement centers adequate in the areas where your employees live?

11. Can you get bus or street car service within reasonable distance of your plant? Can you persuade the public transport people to put on more vehicles at the times your shifts change?

Boiled Down—When you come right down to it, the best way you're going to recruit and keep skilled labor is on your reputation for good labor relations. Personnel men agree that you need not take the help on a junket to Bermuda to get that reputation. They say your attention to the little things can add up to a value that equals the attractions of a world cruise.

Engineers: A More Efficient Use

Engineers, in short supply now and due to become even more scarce in the next three years, may have their talent spread around to prevent a slowdown in the defense program.

A new approach to the problem of finding enough engineers, as outlined by the U. S. Department of Labor, is based on more efficient use of available personnel plus a high-powered campaign to sell qualified high school graduates on the opportunities the field offers. In the way of immediate relief, co-operation is promised from selective service officials, who will take a second look at prospective engineering draftees to see where they actually will be the most help to the defense program.

Steps being taken in the program by several government agencies involved include: Co-operation of state, county and municipal governments in exploring loan of engineers on a full or part-time basis to defense agencies; plans for reactivating the war management, engineering and science program of World War II to prepare persons for specific employment in defense work; alerting all local selective service boards to the need for most careful consideration of all registrants employed as engineers; and wide distribution of the Bureau of Labor Statistics' revised employment outlook for engineers while Engineering Manpower Commission conducts an "active" program to boost enrollment at engineering schools.

Bigger Checks—At Lower Cost

Top executive salaries vaulted up an average 75 per cent in the period 1940-1949. But even this huge increase failed by more than half to keep pace with the 179 per cent rise in average sales recorded by the companies they managed.

Those are the figures reported by the National Industrial Conference Board after a study including data on the three highest paid executives in each of 567 companies representing 45 different industries. The board adds that as a result of the increase in sales, actual cost of management declined over the period in terms of the sales dollar. Top management of the companies concerned received an average 0.3 per cent of the sales dollar in 1949 as against 0.4 per cent in 1940.

Hang On to Your Salesmen

Don't disband your sales organizations just because anxious buyers are tumbling over each other to place orders with you.

That was the advice of Charles W. Bishop, assistant to the vice president of Chrysler Corp. at the annual sales meeting of Heppenstall Co., Pittsburgh steel forgings manufacturer.

Warning of the high cost of hiring and training capable sales personnel, Mr. Bishop recommended studies to see how such people, when temporarily not needed in customer contact work, can be usefully transferred to other duties within their company.

Cyanamid Gets AEC Projects

American Cyanamid Co. is performing two non-profit research projects for the Atomic Energy Commission—the first to find new ways of recovering uranium from various ores and the second for operation of a plant to recover nuclear fuel from used reactor fuel elements. The company will carry on uranium recovery research at Watertown, Mass., and is working on nuclear fuel recovery at AEC's reactor testing station near Idaho Falls, Idaho.

From Bumper to Tailgate . . .

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NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

A hot subject around Detroit is machine tool production by automobile companies. Not all can do it, but Fisher may produce Bullard tools

DETROIT

MANY REASONS have been thought of by machine tool builders as to why the latest Reuther plan (STEEL, July 9, p.57) won't work.

Mr. Reuther proposed establishment of government-owned assembly plants into which mass-produced tool components could be fed by metalworking companies not associated with the industry. The machine tool men with few exceptions have not chosen to lay these reasons out for public inspection. About the only man who has spoken against the plan is Matthew Smith, national secretary, Mechanics Educational Society of America.

Flexibility—As anyone who has been inside a diversified machine tool builder's plant knows, an extremely high degree of flexibility is required. The misconception about tools is much like that about steel. No machine tool is just a tool, nor is a piece of steel just steel. Both may differ in hundreds of respects from similar ones.

Mr. Smith makes the point that a high percentage of tools are made to customers' specifications and to separate this branch of the industry from the whole would leave little room for more mass production than presently exists. He calls Reuther's suggestion "stupid," says "it fulfilled its purpose of further advertising the pseudo-engineering genius of the ubiquitous Walter."

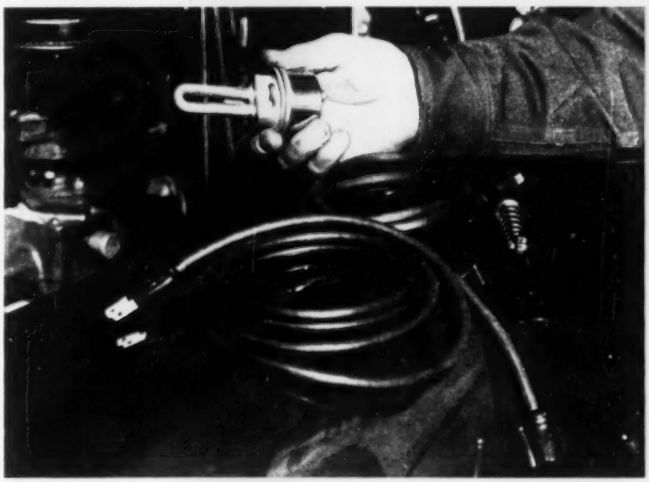
Solution—The way to lick the machine tool shortage, says Mr. Smith, is to give members of the existing industry a ten-year order backlog and dispose of any surplus tools by the Marshall Plan or Point 4. "It is our considered opinion," he states, "that machine tool makers . . . can expand their present facilities to meet the defense emergency if someone will arrange that the machines built will not drive the same manufacturers into bankruptcy at the end of the defense program."

Government officials are more than a little interested in Walter Reuther's proposal. At a recent meeting with DPA, automobile industry representatives were queried as to how they could fit machine tool building into their operations. One of the things it was suggested they could do is make more of their own tooling for new models and wherever it's possible rebuild their own equipment. The government was advised that tool production would not be a foreign endeavor for several of the car makers. Some did it in the last war.

Fisher Will Do It—One of these —Fisher Body Division of General Motors — is about to embark on it again. The rumor mills have ground out all kinds of stories about the venture, while the parties involved went quietly about their negotiations. At press time no order has been received by Fisher Body for the vertical turret lathes it expects to build under a contract with Bullard Co., Bridgeport, Conn., but final details are being worked out.

Fisher Body is working under the assumption that it will be scheduled to produce 90 Bullards a month, a figure which is understood to be more than double Bullard's own capacity. So that there is no question as to the genealogy of the machines it is believed that one of the stipulations of the contract will be that a plaque be cast into the main frame with the legend "This is a General Motors-Built Bullard Machine."

The Adroit Mr. Reuther—Walter Reuther, it appears, may gain some man-on-the-street prestige from the Bullard-Fisher Body deal. In his proposal the only tools mentioned specifically by name are Bullards, these being characterized by him



FOR A FAST START: Designed by General Electric Co. especially for Chevrolet automobiles, this little Calrod engine heater can save a lot of winter grief. It is permanently installed in the engine's freeze-out plug opening between the cylinder walls. By pre-warming the cooling fluid surrounding the engine block, the heater gives quick starting and reduces starting load on battery and engine wear caused by slow circulation. Unit consists of tubular heater and two heavy-duty extension cords for connection to electrical outlet

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as "among the most critical of our tool-machines." Actually the Bullard-Fisher Body arrangement has been in the works for months, long before Walter Reuther penned his proposal to President Truman and Defense Mobilizer Wilson.

Hudson Settles with CIO

Peace has settled over the Hudson Motor Car Co. after two months of bitter wrangling, called by the UAW, a lockout—by the company, a strike. After a shutdown that lasted from May 18 to June 11 work was resumed with what the union said was an inadequate work-force on some of the final assembly operations. As unfinished cars started rolling off the line the plant would be closed down. This stalemate took a new turn when in the final week of July the union advised its members to take new jobs and the company vainly announced that operations were scheduled. No cars have been made since.

Under the agreement reached on Aug. 10 and ratified by union members almost unanimously last Monday there is to be a joint time study conducted on the operations which have been subject of the complaint. The company has agreed formally to keep its plant in operation eight hours a day, five days a week "as long as business conditions warrant." Full resumption is scheduled for today.

Ford May Drop Wood Trim

It's a safe bet that future Ford and Mercury station wagons will be devoid of wood trim now that Ford Motor Co. is negotiating to sell its Iron Mountain, Mich., plant. The all-steel station wagon body requires infinitely less maintenance than ones bearing the products of the forest. Owners attest that to keep a wood-trimmed car looking its best and without squeaks necessitates much of the loving kindness which must be given a boat.

The Iron Mountain plant has been the subject of intense scrutiny by Ford officials for a long time. Body parts have had to go to Michigan's upper peninsula where the wooden members (in recent models only the trim, the body panels are steel decal-grained to resemble wood) were attached, the body assembled and shipped back to the Rouge.

The facility which comprises 750,000 square feet and includes four manufacturing buildings, a saw mill, chemical plant, hydroelectric plant, steam power and filtration facilities will be sold to a group of companies, undisclosed as yet, but known to represent a diversity of industries. These companies, according to L. D. Crusoe, Ford vice president, are expected to employ most of the operation's present force of 1800.

After the sale is completed an "interim program" will continue into the fall with the station wagon body assembly work scheduled to be fitted into the Rouge plant late this year.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,878
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,673	897,853
Six Mos.	4,137,195	3,941,878
July	527,502*	746,801
August		842,335
September		760,847
October		796,010
November		833,784
December		671,622
Week Ended	1951	1950
July 28	131,462	191,978
Aug. 4	117,010	175,572
Aug. 11	97,242	182,965
Aug. 18	115,000*	190,879

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Briggs Educates To Stop Waste

An experiment at pointing out the needlessly large amount of waste that occurs because of sloppy work habits proved so successful it is being used again by Briggs Mfg. Co. Using a four-page comic-book format which it enclosed in the employees' magazine Briggs told (STEEL, Mar. 5, p.66) how carelessness had resulted in the loss or damage of small standard parts to the tune of $171,563 during the 1950 model run.

Subject of the latest message is "trim waste—a tragedy in many acts." The total cost of damaged trim for 1950 models, according to the Briggs calculation, was close to $488,940.14. Some of the acts which brought about this staggering cost included careless loading on conveyors, failure to stack seat cushions and other trim material properly, careless installation which causes damage to already installed shield, kick-pads and arm-rests, and allowing sharp tools to protrude from pockets and catch on the material.

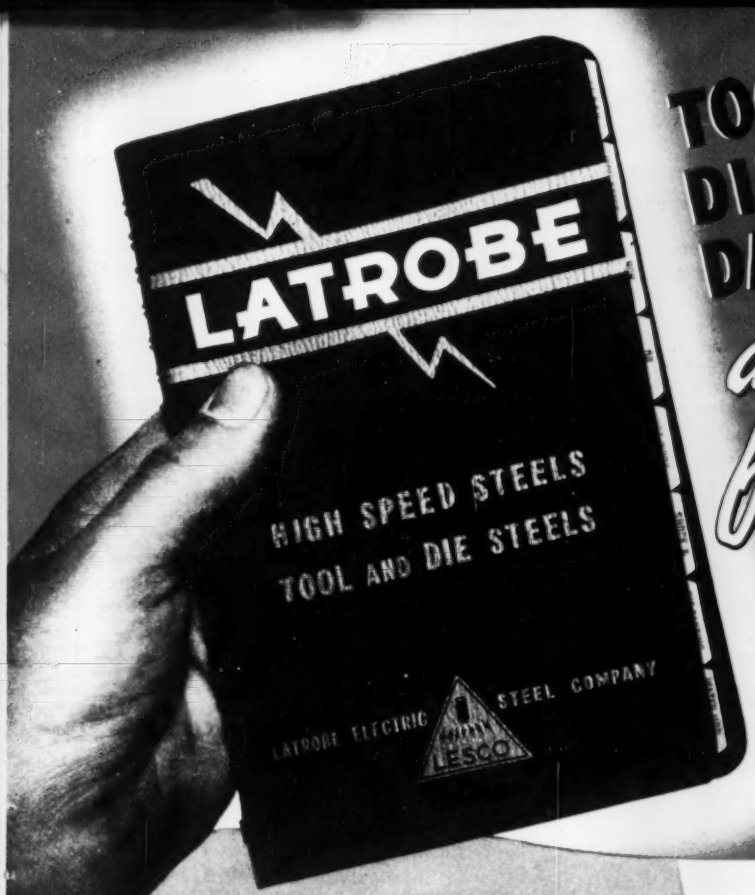
Chrysler Hunts for Scrap

While Briggs is working to cut down the loss from scrapped fabric, Chrysler Corp. is doing the kind of job sorely needed for ferreting out ferrous scrap. During the first month of its campaign to scrutinize tools and dies to see how many could be dispensed with the company found 600 tons of metal. During the last two weeks an additional 1525 tons of equipment has been ordered scrapped. That is in addition to the 35,000 tons of production scrap which is generated monthly by the corporation. About half of the dormant scrap which has been recycled was at Chrysler, the rest was in suppliers' plants.

As set up by Chrysler, the continuing program calls for a monthly review of the tools and dies used for making 2500 service parts.

Buick Converts Rapidly

At Buick Motor Division of General Motors, 1.2 million square feet of floor space previously devoted to car production has been turned over to military work, reports Ivan L. Wiles, general manager. By next year at this time the total area being used by Buick for war work will be over 4 million square feet. About half of that will be in the new plant being built at Flint for production and subassembly of parts for the Wright J-65 Sapphire Jet engine. Another million square feet will be covered by that engine's new assembly and test facility at Willow Springs, Ill. Additionally, 700,000 square feet in 12 Buick factories in Flint have been given over to production of CD-850 tank transmisssion, and another 500,000 square feet at Grand Blanc, formerly the parts warehouse, will be used for tank production.



TOOL AND DIE STEEL DATA... *at your fingertips*

- ★ ANALYSES AND PROPERTIES
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- ★ FORMS IN WHICH FURNISHED
- ★ TYPICAL APPLICATIONS

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Bolting of structural joints cuts construction costs!

If you are interested in substantial savings in erecting your next building, follow the example of one of America's largest housing projects.

F. H. Frankland, prominent New York consulting engineer, convinced its builders that *bolting* would prove much more economical (than the usual riveting) in making field connections. New York's Board of Standards and Appeals approved his recommendation.

The results? Erection costs were cut considerably, and the job was completed in far less than the usual time. Today, four years after construction, the joints are as sound and firm as the day they were torqued. Column splicing, which sometimes causes riveted joints to spread, cannot occur in bolted joints.

Though the initial cost of bolts is higher than rivets, savings in labor make the ultimate cost lower. Studies indicate that the total *assembled* cost of a rivet can run as high as *thirty times* the total *assembled* cost of a bolt in the same connection.

While savings can be obtained by the use of standard machine bolts in place of rivets, the work of the Research Council on Riveted and Bolted Structural Joints indicates that further cost benefits can be realized by designing joints for assembly with quenched and tempered steel bolts to A.S.T.M. Specification A-325.

Address RB&W at Port Chester for a report on "The Effect of Various Fasteners on the Fatigue Strength of a Structural Joint."

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106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

The Business Trend

Industrial activity index sinks to eight-months low as production of defense material fails to take up slack caused by curtailment in civilian lines

PLANT-WIDE vacations in the nondurable goods industries and group layoffs in consumer lines are taking their toll of production. And the gap is not being filled by armament deliveries rapidly enough to halt the drop-off that began in business activity in July.

The week ended Aug. 11 underscored the downward trend of activity. STEEL's industrial production index, at 205 per cent of the 1936-1939 average for that week, set the lowest mark for a non-holiday week since the one ended Dec. 2, 1950, when industry was fighting a losing battle with the weather. Since the first of July the index has chalked up consecutive marks of 186, 206, 213, 213, 209 and 205. Cause of the marked drop in the past two weeks has been the withering of automobile output due to week-long closings of several big assembly plants. The auto production component of the index is down 22 points from last year's high perch.

Industrial production in July, as measured by the Federal Reserve Board, was at its lowest point since last November. That agency's index of industrial output dipped to 215 per cent of the 1935-1939 average in July, according to a preliminary report of the President's Council of Economic Advisers. Its June index figure was 222.

The index of manufactured durable goods for July showed a 3.3 per cent drop while manufactured nondurable goods output slipped 4.1 per cent. Minerals production declined 4.2 per cent.

Auto Assemblies Set '51 Low . . .

Chief culprit in the downfall of the production indexes has been automobile and truck production. In the week ended Aug. 11, it set a new low for the year. *Ward's Automotive Reports* estimated total assemblies in U. S. and Canadian plants at 97,242 cars and trucks, well below the prior week's turnout of 117,010. In 1950's comparable week, production was 182,965 automobiles and trucks.

In the first six weeks of the third quarter, passenger car producers have completed nearly 507,000 vehicles. Seven weeks remain to build the 1,200,000 units permitted by the National Production Authority. Passing the halfway point, the "Big Three" are close to their quotas of the industry schedule. Faltering by the independents as a group would seem to nullify any chance of reaching the production mark, says *Ward's*.

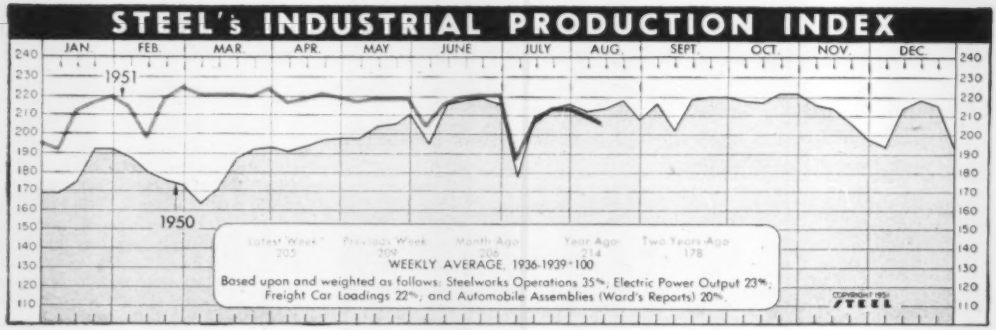
Truck makers will be allowed to assemble only 265,000 trucks in the fourth quarter, a reduction of 7 per cent from the third-quarter rate. NPA allotments of controlled materials will constitute unit limitations on output. Advance allotments for the first three quarters of 1952 will be well below present schedules.

Steel Holds Torrid Pace . . .

While the auto and other civilian lines are getting increasingly smaller allocations of controlled materials, basic metals output has remained on a lofty plane through the hot weather. Steelworks operations are a good example: In the week ended Aug. 18, the yield was slated to be 2,029,000

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	102.0	102.0	101.5	99.5
	Electric Power Distributed (million kilowatt hours)	7,070	7,003	6,739	6,253
	Bituminous Coal Production (daily av.—1000 tons)	1,668	1,704	235	1,760
	Petroleum Production (daily av.—1000 bbl)	6,195	6,201	6,171	5,675
	Construction Volume (ENR—Unit $1,000,000)	$216.9	$267.6	$361.0	$164.0
	Automobile and Truck Output (Ward's—number units)	97,242	117,010	117,747	182,965
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,635; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (Unit—1000 cars)	820‡	813	779	847
	Business Failures (Dun & Bradstreet, number)	149	171	173	194
	Currency in Circulation (in millions of dollars)†‡	$27,904	$27,842	$27,893	$27,015
	Department Store Sales (changes from like wk. a yr. ago)‡	15%	21%	0%	+30%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,663	$14,657	$16,065	$13,671
	Federal Gross Debt (billions)	$255.6	$255.6	$254.7	$257.4
	Bond Volume, NYSE (millions)	$11.9	$11.3	$12.3	$19.3
	Stocks Sales, NYSE (thousands of shares)	7,580	8,538	5,441	9,335
	Loans and Investments (billions)†	$70.1	$70.1	$70.3	$67.8
	United States Gov't. Obligations Held (millions)†	$30,997	$30,949	$30,886	$35,496
	†Member banks; Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.99
	STEEL's Nonferrous Metal Price Index‡	224.6	225.1	226.0	197.0
	All Commodities†	177.8	177.6	179.7	166.3
	Metals and Metal Products†	188.1	188.2	188.2	174.0
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 205
Previous Week 209
Month Ago 206
Year Ago 214
Two Years Ago 178
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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*Week ended Aug. 11

tons of ingots and steel for castings. This would be a rise of 8000 tons from the output of the week before and nearly 100,000 tons more than were turned out in 1950's comparable week which was also one of above-capacity operations.

Plant Awards Slump . . .

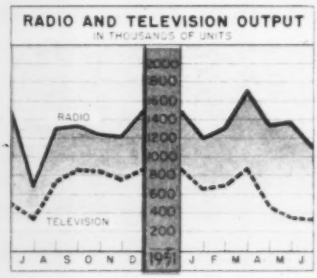
Sharp drop in volume of industrial contracts awarded, on the heels of recent high weekly totals, caused construction awards to drop to $217 million in the five days ended Aug. 9. The week's mark was 24 per cent below the average week to date this year. Under contract for the 32 weeks of 1951 so far is $9146 million, 27 per cent better than the 1950 volume despite the letdown in residential and commercial segments.

With about an even split between residential and nonresidential building, total contracts awarded for 37 eastern states in July amounted to $1,084,667,000, says F. W. Dodge Corp. Total construction, including public works and utilities, came to $1,379,830,000. Both figures are slightly under June levels.

Jobs for All . . .

Highest July employment level on record was set this year, when a mid-month count found 62,526,000 holding jobs. Included in this count were a good number of workers temporarily laid off as employers seem reluctant to part with trained workers in expectation of a fall pickup in business.

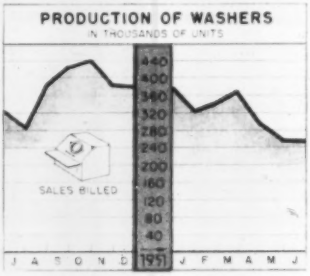
A good barometer of employment trends is the iron and steel industry. Hirings in that industry in June climbed more rapidly than in any other month since last July, resulting in a record high total of 674,200 employed as estimated by the American Iron & Steel Institute. The increase was nearly 7000 over May and about 38,000 over June, 1950. Payroll of the industry in the first half of



Radio and Television Output
Thousands of Units

	Radio		Television	
	1951	1950	1951	1950
Jan.	1,261	935	616	439
Feb.	1,313	1,059	879	480
Mar.	1,720	1,349	875	687
Apr.	1,337	1,254	469	543
May	1,374	1,215	339	486
June	1,093	1,491	327	592
July		666		327
Aug.		1,304		721
Sept.		1,335		844
Oct.		1,230		838
Nov.		1,216		739
Dec.		1,566		858
Total		14,590		7,464

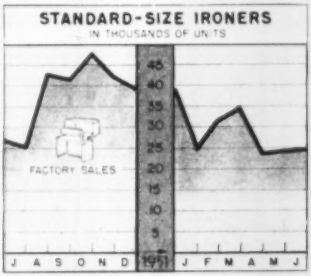
Radio-Television Mfrs. Assoc.



Household Washers
Sales Billed—Units

	1951	1950	1949
Jan.	321,092	275,576	172,400
Feb.	341,328	342,967	201,300
Mar.	368,455	423,802	242,500
Apr.	292,193	333,072	192,500
May	253,542	304,640	211,700
June	253,119	325,217	260,709
July		282,261	200,900
Aug.		381,452	323,789
Sept.		424,043	267,281
Oct.		439,924	333,728
Nov.		379,964	298,717
Dec.		377,013	237,591
Totals		4,289,931	3,033,106

American Home Laundry Mfrs. Assoc.



Standard-Size Ironers
Factory Sales—Units

	1951	1950	1949
Jan.	24,600	29,300	28,300
Feb.	32,400	27,600	28,400
Mar.	34,700	37,800	23,800
Apr.	23,700	31,600	18,100
May	24,200	27,400	19,500
June	24,500	27,100	21,100
July		25,100	17,700
Aug.		42,700	32,300
Sept.		41,400	27,700
Oct.		47,500	36,045
Nov.		41,900	35,000
Dec.		38,800	19,400
Total		409,200	307,345

American Home Laundry Mfrs. Assoc.

Charts—Copyright 1951, STEEL

the year was slightly over $1.4 billion, up 25 per cent from 1950's first six months. The industry's wage earners were paid an average of $1.95 an hour in June.

A Turn for the Worse . . .

After a nine-week decline, wholesale prices turned around and went uphill in the first week of August. The Bureau of Labor Statistics' wholesale price index on Aug. 7 was 177.8 per cent of the 1926 average, an increase of 0.1 per cent over the week before. Prices of metals, metal products and building materials showed slight drops, but were outweighed by rises in farm products.

Buyers See Light Ahead . . .

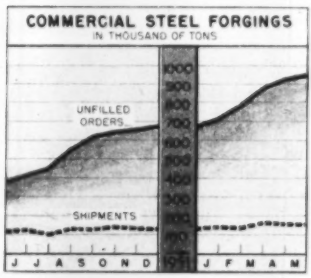
In its monthly survey of members, the Purchasing Agents Association of Chicago at the end of July found deliveries from suppliers to be faster and prices virtually unchanged. Inventories, while high, appear to be increasing; production and employment are falling off along with the backlog of orders. Advanced buying policy is being shortened as the purchasing agent becomes more cautious. The report notes that though the pace of business is still downward, the rate of change has been decreased, suggesting perhaps that stability may be near at hand.

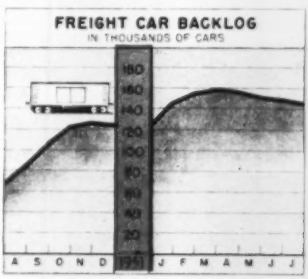
Trends Fore and Aft . . .

Profit rates in all but three of 25 major manufacturing industries were "substantially higher" in 1950 than in the prewar year of 1940, a study by the Federal Trade Commission shows. . .Personal income in June rose to an annual rate with seasonal adjustments of $251 billion, $1 billion higher than May and up 15 per cent since Korea. . .Warner & Swasey has more than doubled its rate of machine tool output in the last year. . .Since 1929, approximately two out of every three dollars of national income per year have gone for wages and salaries. . .First half sales of television picture tubes were 20 per cent below 1950's January-June period. . .Federal, state and local taxes absorb about 25 per cent of national income.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction	July30	Gear Sales	Aug.6	Ranges, Elec.	July30
Durable Goods	Aug.6	Gray Iron Castings	Aug.13	Ranges, Gas	July30
Employ., Metalwk.	July16	Indus. Production	July23	Refrigerators	Aug.6
Employ., Steel	July23	Machine Tools	Aug.6	Steel Castings	Aug.13
Fab. Struc. Steel	July30	Malleable Castings	Aug.13	Steel Shipments	July2
Foundry Equip.	July16	Prices	July23	Vacuum Cleaners	Aug.6
Furnaces, Indus.	Aug.13	Pumps, New Orders	July9	Wages, Metalwkg.	Aug.13
Furnaces, W. Air	July30	Purchasing Power	July23	Water Heaters	June25





Commercial Steel Forgings

Thousands of Net Tons

	Shipments		Unfilled Orders	
	1951	1950	1951	1950
Jan.	138	93	709	327
Feb.	129	93	781	341
Mar.	161	109	875	350
Apr.	154	99	924	357
May	156	114	949	373
June	...	117	...	408
July	...	95	...	446
Aug.	...	124	...	548
Sept.	...	122	...	620
Oct.	...	137	...	643
Nov.	...	130	...	657
Dec.	...	128	...	674

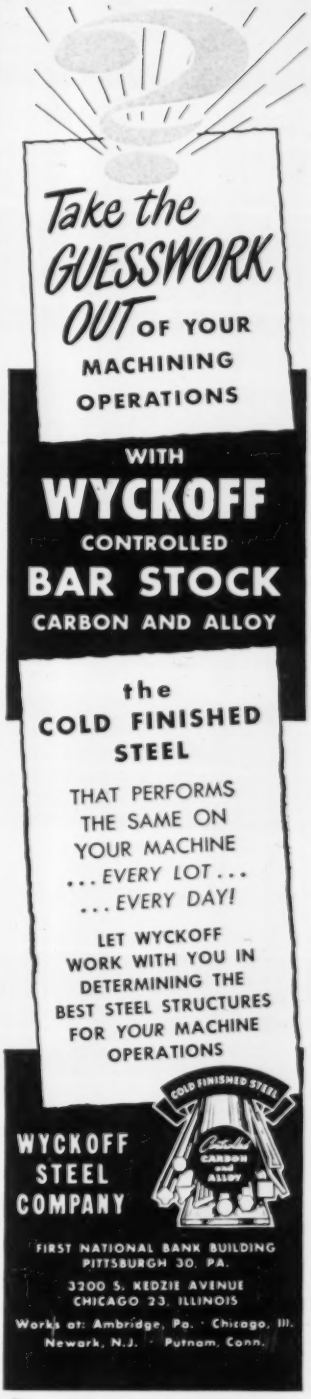
U. S. Bureau of the Census.

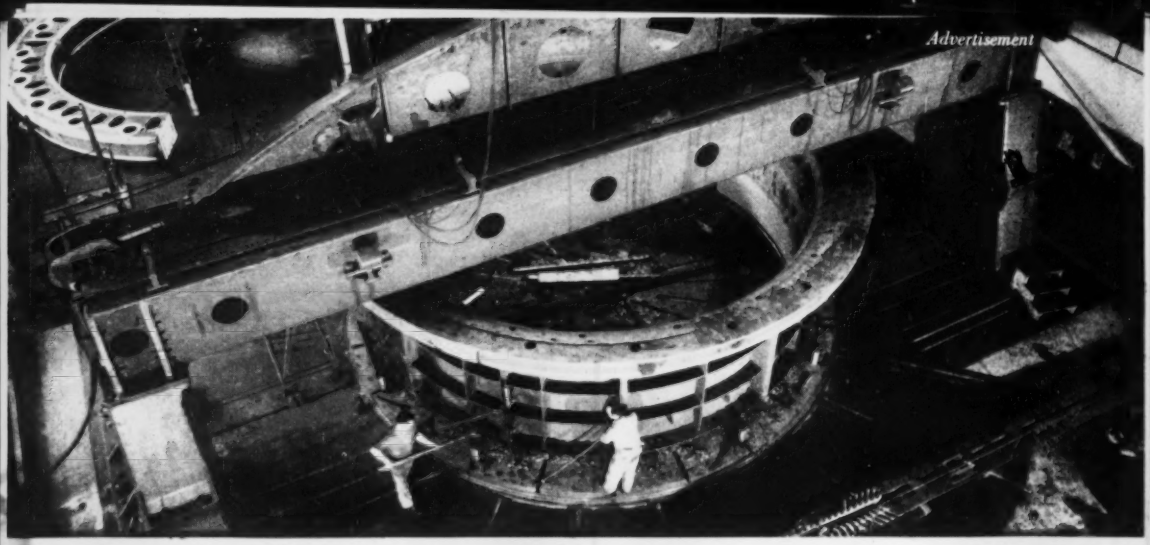
Freight Car Awards and Backlogs

	Awards		Backlogs*	
	1951	1950	1951	1950
Jan.	26,356	9,376	144,758	19,026
Feb.	15,947	9,065	154,861	26,055
Mar.	11,271	6,201	158,619	30,539
Apr.	6,628	3,298	155,871	32,857
May	4,919	11,636	156,628	42,300
June	6,793	2,095	147,725	40,585
July	2,417	30,065	144,810	67,084
Aug.	...	23,550	...	86,156
Sept.	...	25,111	...	106,611
Oct.	...	21,886	...	122,148
Nov.	...	10,573	...	126,870
Dec.	...	3,326	...	124,489
Total		156,482		

* End of month

American Railway Car Institute.

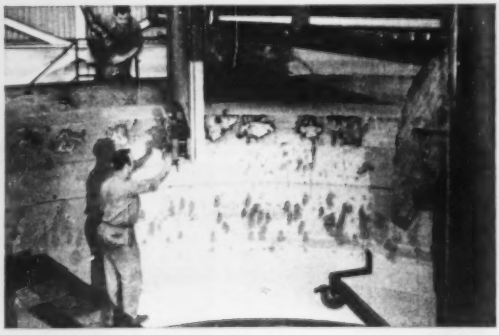




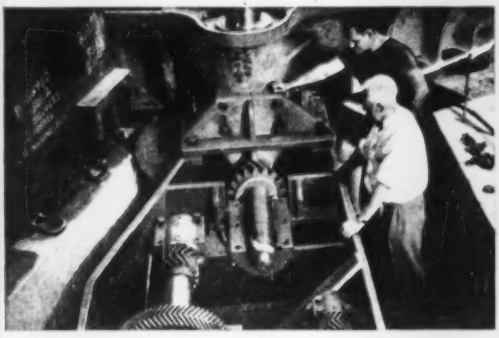
$400,000 VERTICAL BORING MILL, one of the world's largest, bores, turns and faces hydraulic turbine parts. Sunoco Way Lubricant, approved by 39 machine tool builders, was selected by the design engineers to prevent stick-slip with resultant scoring of ways and slides. Even under the weight of work as heavy as 75 tons, Sunoco Way Lubricant has never squeezed out.

TURBINE PARTS 62 FEET IN DIAMETER MACHINED BY HUGE VERTICAL BORING MILL

This mill was installed eight months ago by S. Morgan Smith, well-known hydraulic turbine manufacturer. Without alterations, it can take work up to 22 feet high with a maximum swing of 42 feet between housings. By removing the housings and adding a head to the face plate, it can be modified to handle parts 62 feet in diameter. Sunoco Way Lubricant, specified for the ways and rails by the design engineers, has been used exclusively. The mill accommodates work that weighs as much as 75 tons. No jump or stick-slip has ever marred a finish or impaired accuracy. The ways and rails remain like new. This is typical of the performance that has won the endorsement of 39 machine tool builders for Sunoco Way Lubricant. For an informative booklet and sample, write on your business letterhead to Sun Oil Company, Department S-8, Phila. 3, Pa.



ELECTRONICALLY CONTROLLED CUTTING TOOLS machine a turbine discharge ring 9' high, 27' 8" dia., 21' 8" bore. Sunoco Way Lubricant keeps rails free of rust and corrosion. Starting up after week-end shutdowns, tables and other parts move freely on the ways and slides without jump or stick-slip.



THE SYNCHRONOUS GEAR DRIVE, controlling table speeds from .094 to 6.045 rpm., is pressure-fed with another Sun "Job Proved" product—Sunep. This extreme pressure lubricant is exceptionally stable, minimizes wear, gives long-time protection to very heavily loaded teeth in many types of gear boxes.

Men of Industry

A. WILLIAM TILDER
. . . Acromatic Tool V. P.-gen.mgr.

WILLIAM AVILA
. . . Bardwell & McAlister V. P.-plant mgr.

Acromatic Tool Co., Detroit, elected **A. William Tilder** vice president and general manager. He has had 25 years' experience in various phases of the cutting tool field. He formerly was with Whitman & Barnes Division, United Drill & Tool Corp., where he was manager of the carbide tipped tools and Hercules Interchangeable Punch Division.

George R. Brockway was appointed vice president in charge of sales and advertising, and **Harvey M. Rasmussen,** sales manager of **Rapids-Standard Co. Inc.,** Grand Rapids, Mich. Mr. Brockway formerly was vice president and sales manager, and Mr. Rasmussen was assistant sales manager of the materials handling equipment firm.

Robert C. Evans was appointed executive assistant to **Kenneth T. Snyder,** general manager of the western division, Houston, of **Atlas Mineral Products Co. Edison C. Sickman,** sales co-ordinator of the company, was appointed general sales manager.

Vic Pastushin Industries Inc., Los Angeles, appointed **Virgil F. Bargeron** plant superintendent. He was formerly factory manager, Timm Industries. **H. Russell Hillier,** formerly engineering personnel manager, Long Beach, Calif., division, Douglas Aircraft Co. Inc., was appointed personnel manager. **William B. Stevens** was named chief inspector.

Ralph Rathyen was promoted to assistant manager, crucible and refractories division, **Joseph Dixon Crucible Co.,** Jersey City, N. J. He joined the division in 1939.

William Avila, formerly production head of **Bardwell & McAlister Inc.,** Burbank, Calif., was elected vice president and plant manager.

John W. Fisher, vice president and a manufacturing executive of **Ball Bros. Co. Inc.,** Muncie, Ind., for the last ten years, was named to the dual post of vice president in charge of metal closure and zinc rolling mill operations. In assuming his new duties, Mr. Fisher relinquished other responsibilities heretofore limited to the manufacturing areas of the business.

Duraloy Co., Scottdale, Pa., appointed **J. W. Zinss** general manager of operations. He formerly was assistant to **A. M. Miller,** who was transferred to the Detroit office. **Harry Robbins** was named to assist Mr. Zinss.

H. E. Humphreys Jr. was elected chairman of the board of **United States Rubber Co.,** New York, and continues as president. He succeeds **Herbert E. Smith** Sept. 1. Mr. Smith, chairman and former president, will retire after 38 years' service, but continues as a director and member of the finance committee. **John W. McGovern,** vice president and general manager, tire division, was elected a member of the executive committee. **Howard N. Hawkes** was elected a vice president and appointed general manager of the tire division to succeed Mr. McGovern. Both men will assume their new duties Sept. 1.

Athey Products Corp., Chicago, manufacturer of heavy earthmoving equipment, established a contract manufacturing division as part of its general sales division, and placed **T. V. Shea,** general sales manager, in charge. He is assisted by **L. R. Davis.**

A. R. McInnes was appointed middle western regional manager of **Ridgidized Metals Corp.,** Buffalo. He will make his regional headquarters in Chicago. He was formerly assistant general sales manager of the corporation.

Dr. Henry M. O'Bryan, who has served as assistant executive secretary of the Research and Development Board in Washington since 1947, has been appointed manager of the physics laboratories, **Sylvania Electric Products Inc.,** Bayside, N. Y.

John M. Demarest was appointed assistant to the president of **Utica Drop Forge & Tool Co.,** Utica, N. Y. He formerly was vice president and manager of Marion Power Shovel Co.

Dr. John C. Warner, president of Carnegie Institute of Technology, was elected a director of **Jones & Laughlin Steel Corp.,** Pittsburgh, replacing **Walter H. Dupka,** retired.

Walter W. Edens was appointed defense projects executive, and **Thomas G. McNamara,** chief metallurgist of **Alloy Engineering & Casting Co.,** Champaign, Ill. Mr. Edens formerly was vice president of Badger Brass & Aluminum Foundry Co. Mr. McNamara was chief metallurgist of Continental Aviation & Engineering Corp.

V. H. Ferguson was elected president of the newly formed **Ferguson Equipment Corp.,** Pittsburgh. He re-

V. H. FERGUSON
. . . president, Ferguson Equipment Corp.

signed from Loftus Engineering Corp. to direct this organization, which has established executive and engineering offices at 21st street and Penn avenue. Special attention will be given to designing and building industrial heat treating furnaces and related equipment.

John P. Wright was appointed factory manager of the durable goods operation of **Liquid Carbonic Corp.**, Chicago. He formerly was vice president and general manager, A. B. Dick Co.

Dynakon Corp., Cleveland, appointed **Burton Field** plant manager, and **William Schwartz**, chief chemist.

Howard E. R. Hutton has resigned as assistant secretary of Bell Aircraft Corp., Buffalo, to become comptroller and business manager of **Fleet of America Inc.**, Buffalo, manufacturer of aluminum windows.

V. E. Lysaght, recently appointed sales manager, **Helicoid Gage Division**, American Chain & Cable Co. Inc., Bridgeport, Conn., will continue as sales manager of the Campbell Machine Division and Wilson Mechanical Instrument Division in addition to his new duties.

Charles S. Brown was appointed general purchasing agent for **Lincoln-Mercury Division**, Ford Motor Co., Detroit. He succeeds the late **H. H. Foster**. A veteran of 32 years with Ford, Mr. Brown has been in charge of component purchasing for Lincoln-Mercury since 1948. **Galen B. Price** was named manager, purchasing research department, **Ford Motor Co.**

Raymond J. Bauman was appointed superintendent of assembly, **Delco Appliance Division**, General Motors Corp., Rochester, N. Y. He succeeds **W. E. Fitzpatrick**, retired after 36 years with Delco.

Horizons Inc. appointed **Dr. John T. Burwell Jr.** assistant to the director of research. He will have headquarters at the Horizons' laboratory in Cleveland.

Pacific Airmotive Corp., Burbank, Calif., appointed **Herbert L. Brown** as director of materiel.

L. F. Bross was promoted to manager, rail and track fastenings department, **Robert W. Hunt Co.**, Chicago. **A. A. Barcuther**, whom Mr. Bross succeeds, is on leave of absence due to his health.

RESSLER A. DUSSEAU
. . . Automatic asst. gen. manager

JOHN T. McCARLEY
. . . asst. gen. mgr., Yale & Towne division

Ressler A. Dusseau was appointed assistant general manager, **Automatic Transportation Co.**, Chicago, division of Yale & Towne Mfg. Co. He was chief engineer of rider-type Automatic electric trucks. He succeeds **Theodore Smith**, resigned.

Gerard Kelly was appointed field representative for Telefex sales division of **Audio & Video Products Corp.**, New York.

C. Fred Watkins was appointed sales manager, **Heller Bros. Co.**, Newark, N. J. He will have headquarters in Newcomerstown, O. Before joining the Heller organization, Mr. Watkins was with American Swiss File & Tool Co., most recently as general sales manager.

George I. Ziders was appointed industrial plant engineer for **Sanderson-Halcomb Works**, Syracuse, N. Y., Crucible Steel Co. of America. For the last ten years he was with Donora Works of American Steel & Wire Co., his most recent position that of division industrial engineer.

Clyde W. Hull was named assistant manager of manufacturing, and **Raymond W. Brick**, purchasing agent at **Solar Aircraft Co.'s** San Diego, Calif., plant.

John H. Gorsuch was appointed manager, personnel development, commercial department, **United States Steel Co.**, Pittsburgh.

Appointments in the maintenance and utilities division, **Fairless Works**, Morrisville, Pa., U. S. Steel Co., are: **R. L. Leventry Jr.**, assistant division superintendent; **C. B. Smiley**, assistant superintendent-utilities; and **L. K. Smith**, assistant superintendent-transportation and general services.

John T. McCarley was promoted to assistant general manager, and **Kenneth H. Bergstrom** succeeds him as manager of production at the Philadelphia division of **Yale & Towne Mfg. Co.**

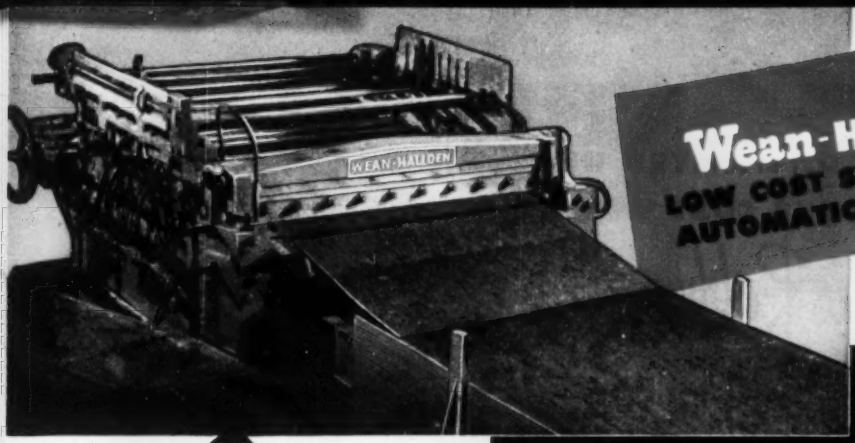
C. H. R. Mackenzie, for 35 years active in the scrap brokerage business in the Detroit area, has organized a co-partnership with Daniel Grant and Earl Grant, formerly with Grant-Smith Corp., under the name of **Grant-Mackenzie Co.**, 17650 Ryan Rd., Detroit. Mr. Mackenzie for many years was with Luria Bros. & Co. Inc. and Luria Steel & Trading Corp. In his new connection he continues in the iron and steel scrap business, and will operate a general scrap steel business and yard.

H. C. Ende Jr. was appointed Milwaukee district sales manager, **Crucible Steel Co. of America.**

Hendley Blackmon was named manager of engineering association activities for **Westinghouse Electric Corp.**, Pittsburgh, to succeed **Frank Thorton Jr.**, retired. **George E. Lambert** was appointed administrative assistant to **Ralph C. Stuart**, vice president in charge of the lamp division at Bloomfield, N. J. **Harold G. Cheney** was made sales manager, electronic tube division, Bloomfield, and later will move to the division's headquarters plant, now under construction in Elmira, N. Y. **Richard S. Sheetz** was appointed materials allocation co-ordinator for the lamp division.

George Gardiner has severed connections with **Louis Allis Co.**, Milwaukee.

Clifford M. Dunn was appointed manager of **General Electric Co.'s** Michigan apparatus district, with headquarters in Detroit. He succeeds



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CLEVELAND, OHIO

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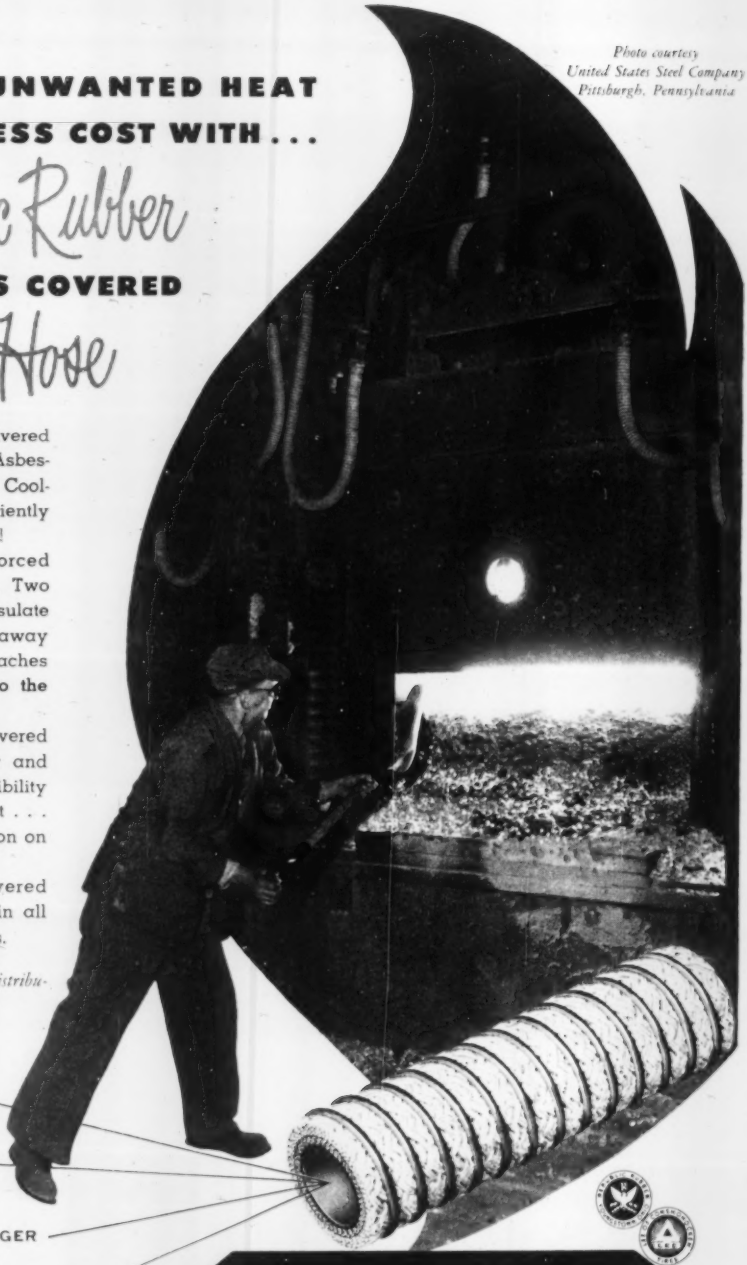
Photo courtesy United States Steel Company Pittsburgh, Pennsylvania



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Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

W. ADDISON WALKER
. . . new president at Giberson & Co.

WILLIAM H. HARRIS JR.
. . . Micromatic Hone V. P.-engineering

GEORGE RUSSELL
. . . treasurer of GM

Arthur R. Hines, appointed assistant manager of marketing for the company.

W. Addisen Walker was elected president, **E. D. Giberson & Co. Inc.,** Maspeth, N. Y. **E. D. Giberson,** founder of the company and a pioneer in the tubular steel industry, becomes chairman of executive committee. **Joseph J. Lipari** was elected vice president and **Morris S. Van Leuven,** assistant secretary. **Wilfrid J. Miller** was appointed sales manager.

National Malleable & Steel Castings Co., Chicago, promoted **John P. Kelleher** to assistant sales manager of its Chicago Works.

William H. Harris Jr. was elected vice president in charge of engineering, **Micromatic Hone Corp.,** Detroit. He was previously chief engineer, and has been with Micromatic for 16 years.

Ray L. Hampton was named vice president in charge of sales by **Mosebach Electric & Supply Co.,** Pittsburgh, manufacturer of track and trolley products for the mining industry, and of special brass and bronze castings for industrial use. He was formerly sales manager. Before joining Mosebach Electric in January, Mr. Hampton was manager of Controller Block & Supply Co., Kermit, W. Va.

George Russell was elected treasurer of **General Motors Corp.,** Detroit, effective Sept. 1. He succeeds **Meyer L. Prentis,** retiring after 40 years' service. Mr. Russell has been finance manager of General Motors Overseas Operations Division. He joined GM in 1927.

Kennametal Inc., Latrobe, Pa., appointed **A. D. Griffin** engineer and representative in the San Francisco district, and **Conrad Seim** in the South Pacific district. **Frank Hull** was added to the central district office at Detroit. The Kennametal office in Cincinnati was moved to 4873 Reading Rd., and the Minneapolis office to 1016 Metropolitan Bldg.

OBITUARIES . . .

Frederic S. Gordon, 64, first vice president, a director and member of the executive committee of **United States Pipe & Foundry Co.,** Burlington, N. J., died Aug. 9. He had been an officer of the company for many years and was also a vice president and director of Centrifugal Pipe Corp., Jersey City, N. J., and a director of Sloss-Sheffield Steel & Iron Co., Birmingham. During World War II he was an executive assistant to Dr. Vannevar Bush, head of the Office of Scientific Research, and received a Certificate of Merit from President Truman for his services.

Theodore L. Brantly Jr., 30, president of **Cro-Plate Inc.,** Hartford, Conn., died Aug. 9 as the result of injuries received in an automobile accident.

Lawrence E. Riddle, 74, retired **U. S. Steel Co.** executive, died Aug. 8. When he retired in 1946 Mr. Riddle was general superintendent of the U. S. Steel Isabella Furnaces at Etna, Pa., and superintendent of blast furnaces at the Duquesne Works. He was nationally recognized as an authority on blast furnaces, and was responsible for many improvements in blast furnace operations and construction. He wrote numerous articles on the subject.

James R. Clark, former works manager, **Yawman & Erbe Mfg. Co.,** Rochester, N. Y., died Aug. 5 in Glendale, Calif., where he resided since retirement.

Robert Turnbull, 81, founder of **St. Lawrence Alloys & Metals Ltd.,** died Aug. 6 at Montreal. He was cofounder of what now is known as Electro Metallurgical Co. of Canada and Volta Mfg. Co., both of Welland, Ont., and the Shawinigan Stainless Steel Industry at Shawinigan Falls, Que.

Hugh J. Scanlon, 76, consultant to **Weirton Steel Co.** and international vice president of Amalgamated Association of Iron, Steel & Tin Workers, died in New York's Memorial Hospital Aug. 7. He made his home in Steubenville, O.

Leonard Michael, 68, one-time assistant manager of the former equipment division of **American Can Co.,** New York, died Aug. 7. He retired from the firm three years ago.

Roy F. Fluno, 60, machine shop superintendent, **Coty Machine Co.,** Watertown, N. Y., died Aug. 6.

Joseph M. O'Connor, 73, president of **O'Connor Machine Co.,** Sheffield, Pa., died Aug. 6.

Bruce B. Bender, 60, treasurer of **United States Radiator Corp.,** Detroit, died Aug. 6.

Edward L. Zapp, chief metallurgist, **Tube Reducing Corp.,** Wallington, N. J., died Aug. 5 of a heart attack. Before joining Tube Reducing he had prior affiliation with Henry Disston & Sons Inc. and with Hyatt Roller Bearing Corp.

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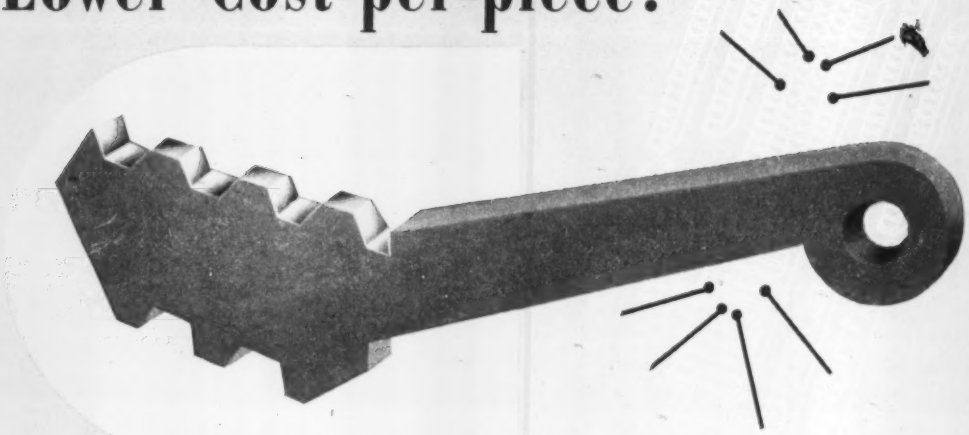

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Production AND Engineering NEWS AT A GLANCE

CANNED ENGINES—Turbojet engines now are shipped by their manufacturers in elaborate steel "bathtubs" of heavy-gage plate costing several thousand dollars each. They are made in two halves and, after the engine is positioned on rubber-mounted hangars so it floats in the container, the top half is bolted in place, with a rubber gasket insuring a tight seal. About 5 pounds of air pressure is applied through a valve and the engine is ready to go. Reasoning is that if a shipment of engines overseas was lost enroute the containers would float and could be rescued. Whether the tubs are ever returned is questionable. One manufacturer says none ever came back to his plant.

KEEP POSTED ON 430—Theoretically there might be many alternative materials to be specified in place of 18-8 chrome-nickel stainless steels which are currently beyond the pale because of nickel restrictions. From a practical standpoint, however, the choice narrows down to the straight-chrome type 430. It is a veteran in the stainless steel field, having been widely used in the automotive industry for trim material and in the chemical industry for absorption towers. To fabricators faced with making a switch from nickel-bearing stainless it offers a convenient out, but they had best first familiarize themselves with the somewhat different properties of 430. —p. 66

CUTTING HOLE TIME—Air driven tool for countersinking holes in heavy-gage sheet aluminum, developed by a leading builder of bomber-transports, is claimed to reduce time required for this work by 80 per cent and man-hour costs by 90 per cent. The tool countersinks a ½-inch hole in 30 seconds, and a typical bomber wing has 15,000 close-tolerance holes of this sort.

WHY TURN IT DOWN?—Welding a 1⅛-inch diameter extension to an armature shaft turned from 3⅛-inch stock saved one manufacturer 25 pounds of shaft stock per armature over turning down the smaller diameter from the rough shaft. Two passes with a semiautomatic hidden arc welding unit gave good penetration and enough weld build-up for finish machining. —p. 75

ARRESTING CORROSION—Cathodic protection of tanks, pipes and power cables is reported by the Navy's Bureau of Docks to extend their useful life by five to ten years. The safeguard against galvanic and electrolytic deterioration is maintained artificially by providing DC power at strategic points, with current flowing toward the metal to be protected. High-quality magnesium anodes so used have effective life of ten years. Four corrosion engineering companies are working with the Navy on the project.

FROM CONE TO CYLINDER—Expanding a rubber die hydraulically into a seam-welded aluminum cone positioned in a die is one way to form a cylindrical shape with a spherical nose, such as might be required for aircraft propeller spinners, fuel tanks, missile casings and the like. It is an unusual variant of stretch-forming. —p. 76

DIRECT READING FOR OXYGEN—Paramagnetic continuous oxygen recorder giving direct analysis for oxygen in industrial gases has been developed by a British instrument manufacturer. Primary element is based on the "magnetic wind" principle, its action resulting from the fact that, of the common gases, only oxygen and nitric oxide are attracted by a magnetic field, oxygen more than twice as strongly as nitric oxide.

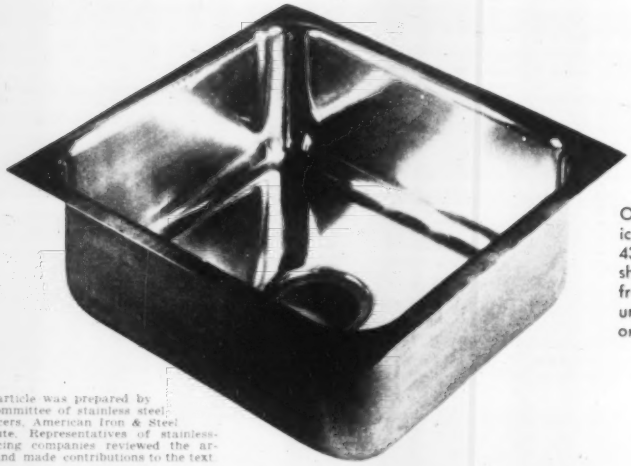
BRICK FOR ROUGH SERVICE—Unburned magnesite-chrome brick for linings of hot metal mixers are showing up favorably in a number of installations where service conditions are too rough for any other brick. The 35 per cent more costly sillimanite brick has no conclusive operating data to support its acceptance. —p. 78

KEEP WHEELS WET—Advice from a grinding wheel manufacturer: When grinding is wet, it should be all wet. The liquid should flood the grinding zone. An intermittent or scant flow may be more harmful than no flow at all. Application of liquid through the body of the wheel by centrifugal force is growing.

GLIB GLEANINGS—Difficulties encountered by an aircraft manufacturer in cementing SR-4 strain gages to cadmium plated surfaces because of the failure of standard cleaners to effect a thorough cleansing of the metal were licked by a switch to tri-ethyl choride. . . . Hollow steel airplane propeller filled with hard sponge rubber is now being made by Hamilton Standard, the sponge being a mixture of oil resistant rubber, phenolic resin and nylon, and serving to keep the blade shell from vibrating under extreme pressure, as well as supporting it against impact. . . Coolant-lubricant identified as Emulsifier STH, a product of General Aniline, was evolved from its German predecessor, Emulphor STH, and is an alkyl sulfoamide acetate sodium salt. Been in shop use in the U. S. for about 18 months. —A.H.A.

Metalworking Outlook—p. 29 *Market Outlook*—p. 123

Nickel Shortage



Ordinary cleanliness during normal service will keep exposed portions of type 430 stainless steel washtub in good shape. To prevent possible corrosion from condensate in inaccessible areas underneath, a coat of waterproof paint or mastic applied on the back side is recommended

This article was prepared by the committee of stainless steel producers, American Iron & Steel Institute. Representatives of stainless-producing companies reviewed the article and made contributions to the text.

STAINLESS steels containing nickel may be out of general use for some time. In the face of current emergency defense needs, our nickel supply is just too small to go around. Manufacturers, therefore, are not being allowed to put the 18-8 grades of stainless steel into certain products.

Many chromium-nickel stainless applications which are now forbidden, have established complete acceptance through the years. For some common applications, these stainless types seem almost indispensable.

Confronted with the necessity of doing without the nickel-bearing stainless steels, like type 302, makers of products for which these grades are either illegal or unobtainable have several courses open to them. They can go out of business, shift to war work, or look for other materials. The instinct of self-preservation and insistent demands for their products have led many companies to seek the third course. As a result, manufacturers are investigating possibilities of type 430—the 17-per cent chromium stainless steel—for utilization where 18-8 grades have been employed formerly.

Chromium Stainless a Possible Alternate—Theoretically, many different materials might be regarded as alternates to chromium-nickel stainless steel. Practically, the service, appearance and fabrication advantages that have made stainless the best choice in each situation tend to keep the choice in the stainless family—even if a grade with different properties must be employed. Though different from the 18-8 grades, type 430 is the best stainless steel available in quantity for general use today.

When the general problem is narrowed down to specific types, there are practical reasons for devoting most consideration to the use of type 430 where type 302 was used before. Any former application that required a better grade of stainless steel than type 302—such as type 316 for corrosion resistance—will hold almost no promise of being satisfactory in a chromium stainless steel of equal chromium content. The same may be said of many applications that have employed types 309 and 310 for high-temperature properties, or type 347 for corrosion characteristics, and so on.

Among the non-nickel-bearing stainless grades, type 430, with 17 per cent chromium, comes nearest to meeting the all-around requirements of general use. For example, the low chromium content of type 410 limits its corrosion resistance. Types 420 and 440 are specialty grades designed for products requiring highly hardenable alloys. Type 446, with higher chromium, poses difficult fabricating problems in many cases. Although considerations of this sort do not rule out other grades, they are so compelling that most of this article is devoted to type 430 and its possible suitability in new applications.

Type 430 stainless is not a newcomer. It antedates the chromium-nickel stainless steels and has a remarkable history of successful application. Absorption towers, used in the manufacture of nitric acid, which were made of type 430 in 1926 are still in service. This grade of stainless remains one of the standard materials for such towers.

In the automobile industry, type 430 stainless is especially popular. Large tonnages go into trim and window moldings where the material must meet demanding requirements, both in complex fabrication and in abusive service conditions.

Type 430 stainless, as an engineering material, "stands on its own feet." Techniques for handling and using it are well developed. However, it may be something of an unknown quantity to those manufacturers who have always worked with type 302.

In many cases, type 430 can be applied successfully where type 302 was used before. Nevertheless, this change is not a straight substitution of equivalents. There are differences in corrosion resistance between the two, and there are also differences in mechanical properties which affect fabrication. In fact, using the alternate material may influence manufacturing

Shifts Focus to Type 430 Stainless

Here may be the best all-around material among the non-nickel-bearing grades. It has a history of many successful applications under exacting requirements. Manufacturers forced to shift from the 18-8 grades must familiarize themselves with a new set of problems to avoid serious difficulties in fabrication and application

and shop practices more adversely than it does service of a product in end use.

Watch Your Step—No change to type 430 from an 18-8 stainless should be made without care and prudence. There are pitfalls to be avoided. When a manufacturer accustomed to handling type 302 and 304 stainless shifts to type 430, he risks serious disappointment if he fails to familiarize himself with a new set of problems.

Realizing that general fabricators will need help in translating their chromium-nickel experience into a capacity for handling chromium stainless successfully, stainless producers are taking steps to help individual users. As a normal procedure, steel companies review customers' orders, job by job, to prevent embarrassing and costly difficulties. This practice is being intensified.

Sales engineers or other responsible technical personnel examine all orders for type 430 stainless to spot the new ones which may involve shifts from former type 302 products. When they discover such orders, they try to find out as much as possible about the end product, and they offer the customer whatever technical help may be indicated. Also, the steel producers are taking special care to help the personnel of distributors so that they can give service on the small users' problems.

Advisory Service—Obviously, no steel supplier can be responsible for the success of each customer's application or product. The service is purely advisory. Even though a supplier may contribute valuable help and guidance, there is no attempt to dictate what any customer may do with his material or to guarantee performance of any finished article.

If, after studying proposed end uses and necessary fabricating steps, a supplier's sales engineer feels that the application may give trouble, he usually suggests a sample order and a trial run. Before material and manufacturing facilities are committed, problems can then be exposed and solved with some control on cost.

Many Factors Involved—Variables or special conditions in fabrication and application make it impossible to do more here than to point out some factors that must be considered in making any change of alloy. Inasmuch as the considerations grow too complex to be resolved by general rules, it is essential that each individual case receive technical study and attention.

Usually, the first engineering consideration is service or utility. The material must stand up for a commercially acceptable length of time under the mechanical and corrosive conditions to which it will be subjected. Sometimes other requirements are intro-

REPRESENTATIVE PROPERTIES

Comparison of chromium-nickel with chromium stainless steel sheets and strip

AISI Stainless Type	Type 302 (18% Cr—8% Ni) Annealed	Type 302 (18% Cr—8% Ni) ¼ hard	Type 430 (17% Cr) Annealed or cold-rolled
Tensile strength, psi	90,000	125,000	75,000
Yield strength, psi (0.2% offset)	40,000	75,000	45,000
Elongation in 2 inches, per cent	50	12	25
Coefficient of thermal expansion, per degree F (mean value, 32 to 1000° F)	10.2×10^{-6}	10.2×10^{-6}	6.3×10^{-6} [4]
Thermal conductivity, Btu/hr/sq. ft./° F (at 932° F)	12.4	12.4	15.2

Thermal conductivity, Btu/hr/sq. ft./° F (at 932° F)

Differences in properties of chromium-nickel and chromium stainless steels help explain some of the differences found in the way they behave in fabrication.

1. Lower tensile strength permits type 430 to be drawn, bent or sheared with less power.
2. Lower elongation of annealed type 430 stainless steel represents a limitation on the severity of forming in one operation.
3. The work-hardening and strengthening that type 302 stainless steel undergoes has a tendency to spread out its deformation when it is formed. In contrast, type 430 tends to neck down locally with consequent tearing or cracking.
4. Lower coefficient of expansion and higher thermal conductivity make for less distortion during welding of type 430 stainless steel.

duced—resistance to temperature extremes, freedom from contamination, and so on.

Second, it should be possible to handle the material in fabricating processes so that the finished article may be manufactured at a reasonable cost.

Although not a guide for technical decisions, the following review of factors affecting the use of type 430 stainless steel should be of value:

Good Corrosion Resistance—For many conditions of service, the corrosion resistance of type 430 is essentially as good as that of type 302. Corrosion charts published by most steel producers may be of value in making preliminary appraisals. When corrosion data are translated into products, a material in any article is either commercially adequate or it is not. By product applications, a number of the places where 18-8 stainless have been customary can be filled satisfactorily with type 430, based on its corrosion resistance.

Type 430, with proper design and fabrication, will not fail in ordinary atmospheric exposure. However, it does have a greater tendency toward superficial discoloration and is somewhat more susceptible to pitting under accumulated dirt than is type 302. To maintain first-rate appearance, then, type 430 needs more maintenance, because cleanliness is essential to keeping it bright.

Stainless exteriors are often neglected in the optimistic feeling that the metal is indestructible or somehow capable of staying bright without care, while nearby glass gets regular washing. This demanding, though highly complimentary attitude has led to abuse of type 302 in exterior applications. The same problem can arise with type 430, and this alloy's somewhat greater vulnerability may lead to a more serious situation.

Make Exposure Tests—Because type 430 stainless does not have as good resistance to local pitting attack as type 302, particular caution is indicated when the former type is considered as a substitute for type 302 in corrosive chemical environments. Problems may arise where the service involves acids, salts, halogens and chlorides in particular, or adherent deposits, which may be encountered in the chemical and chemical-process industries. In the absence of reliable data, a minimum basis of appraisal should include exposure tests embracing fabricating and joint conditions simulating those of the finished job.

Accumulations of dirt, food or process material must not be allowed to remain in contact with equipment for protracted periods. Type 430 can be cleaned with any of the agents suitable for type 302 if cleaning is followed by a thorough rinsing. Like type 302, the chromium stainless can withstand brief exposures to damaging conditions, but it must be cleaned afterward.

When contamination is a problem, many otherwise sound type 430 applications must be ruled out by the possibility of superficial rusting.

BREAKDOWN OF STAINLESS STEEL PRODUCTION
(Ingots—Net Tons)

	All Chromium-Nickel Types		All Chromium Types		Type 430 only		Total
	Ingot Tons	%	Ingot Tons	%	Ingot Tons	%	Ingot Tons
1943	332,119	73	125,249	27	15,796	3½	457,448
1944	351,967	74	125,531	26	42,036	9	477,498
1945	380,659	70	162,245	30	[redacted]	15½	542,904
1946	405,231	74	144,866	26	82,811	15	550,097
1947	353,037	68	166,896	32	106,881	20½	519,933
1948	416,387	67	200,991	33	123,557	20	617,378
1949	282,070	62	173,023	38	123,723	27	455,093
1950	486,062	60	319,786	40	223,438	28	805,848

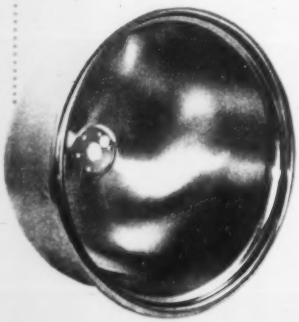
The chromium stainless steels, far from being unknown alloys, have consistently represented about one-third of total stainless steel production. Type 430, while gaining steadily in relative importance, has accounted for a total of 802,079 ingot tons during the eight years tabulated above. This figure includes type 430F, the free-machining modification.

Fabricating Chromium Stainless — Nickel makes stainless steel easier to work. A most important reason for the popularity of nickel-bearing stainless types in competition with their chromium counterparts has been the relative ease with which the former can be drawn, bent, polished and joined with ductile welds. Techniques of fabricating both grades of stainless steel are well developed. Data books published by many of the steel producers will be found helpful in setting up shop procedures for chromium stainless.

Type 430, contrasted with type 302, is somewhat more critical in drawing and bending. Almost anything that can be made of type 302 can be also made of type 430, but more steps or operations may be required. Scrap rates may be higher.

With drawing characteristics somewhat like those of mild steel, type 430 stainless can usually be reduced about 20 to 25 per cent in the first draw (up to as much as 35 per cent in some cases) and about 15 per cent in a subsequent draw. Annealing between draws may not be necessary. Some manufacturers warm blanks in boiling water before drawing. This may be helpful. In any event, stock to be worked should be up to room temperature.

Surface Condition Important—The best surface condition for drawing is the temper-rolled No. 2-B sheet finish or No. 2 strip finish. Softer stock tends to become marred with wrinkles or stretcher-strains. Even under good conditions, type 430 tends to have an "open" or superficially (*Please turn to Page* 86)



A tub for a domestic washing machine with a well-rounded shape that permits forming it of type 430 stainless steel in a single draw. The bead around the top is rolled in afterward

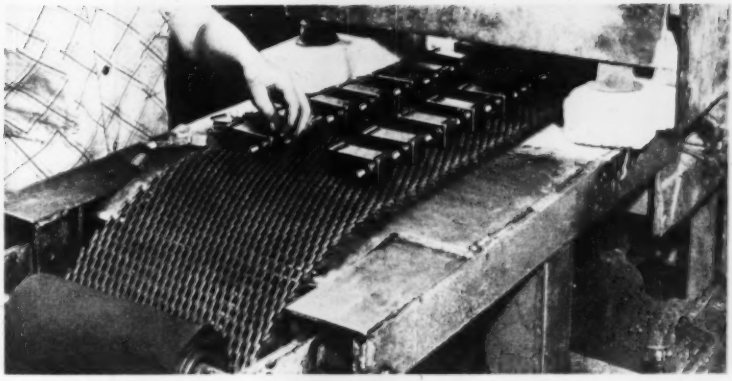


Fig. 1—Loading the conveyor of a continuous copper brazing furnace with stamped assemblies having bushings made on a screw machine. A short copper wire placed at each end bonds the joints as the parts are conveyed through the furnace

Assemblies Economically Produced by Brazing and Soldering

A commercial metal joining concern does many jobs in continuous furnaces, but batch type furnaces and induction heaters are well adapted to certain classes of work

by N. M. SALKOVER
Technical Metal Processing Inc.
Cleveland

MANY economical furnace copper brazing and silver soldering jobs are constantly in process at the plant of Technical Metal Processing Inc., Cleveland, commercial metal joining concern and manufacturer of brazed assemblies. This company operates two continuous and two batch type furnaces, all with controlled atmospheres, and supplements them with induction heating equipment for applications where localized heating, usually for silver soldering, is more efficient.

Atmosphere Controlled — Controlled atmospheres are supplied by seven generators. This deliberately excess generator capacity not only supplies gas of the two standard basic types to handle individual requirements, but also prevents production delays when generator repairs are needed.

The two gas types, borrowing trade names from one of the generator manufacturers, are Endogas (endothermic) and Exogas (exothermic). Endogas is used for many copper brazing jobs, especially where copper oxide is to be reduced or maximum flow of copper is required. Exogas is employed, however, for about 80 per cent of furnace copper brazing work, because most customers favor the smooth joint fillets formed in this atmosphere, and gas production costs are lower, there being no secondary combustion.

Natural city gas of 1000 Btu heat content is employed in making the controlled atmospheres, the air-to-gas ratio being about 5.5 or 6 to 1. Furnaces are electrically heated because, in controlled atmosphere equipment, only electric heating avoids the use of muffles or radiant tubes, both likely sources of trouble at copper brazing temperatures in excess of 2000° F. During the brazing operation all oxides are reduced, and oil or grease are burned away generally without leaving deposits. Only when sheet metal parts have been drawn with compounds that contain pigments is it necessary to preclean. If pigments are present, the parts are preferably cleaned first in a pressure type alkaline washer.

Parts Silver Soldered—Brazing furnaces are also employed for bright annealing steel and nonferrous materials, but only a minor part of the work done is in this category. About 70 per cent of the work

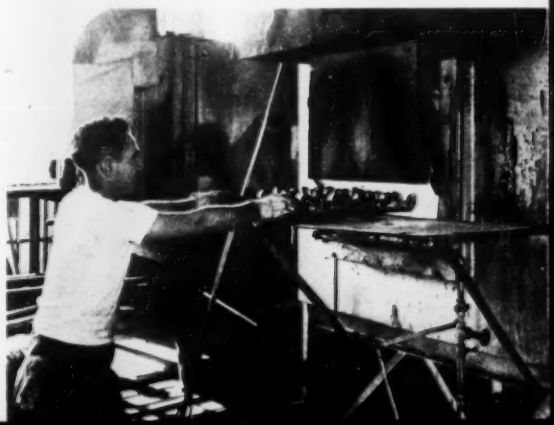


Fig. 2—Operator here is pushing a tray loaded with stamped covers and cast iron elbows into one of the batch type controlled atmosphere furnaces

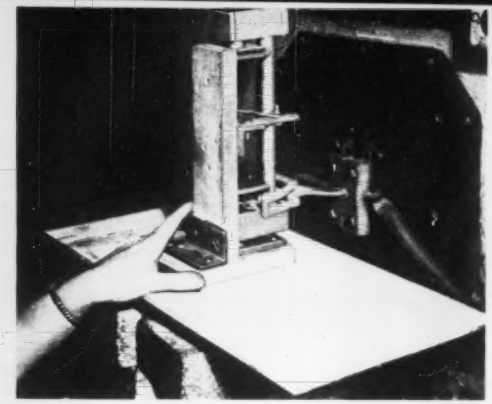


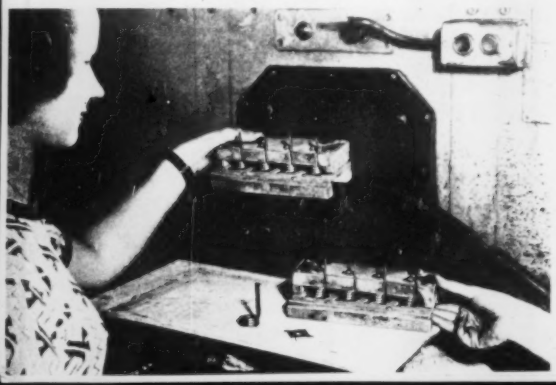
Fig. 3—Steel parts, held in correct relative position in the insulating fixture shown here, have certain joints silver soldered by induction heating in this setup to produce a gas manifold assembly

handled is copper brazing of steel and only 10 per cent is silver soldering, done principally by induction heating. Induction silver soldering, with its sharply localized heat pattern, and its relatively low temperature of 1350° F—1400° F, does not decarburize steel appreciably, and anneals only the limited areas brought up to soldering temperature. Sometimes, depending upon the individual job, silver soldering is handled efficiently in the copper brazing furnaces.

If parts copper brazed in Exogas atmosphere are to be hardened subsequently and no decarburization is permissible, some type of carburizing after brazing and before hardening is advantageous. Exogas generally produces slight decarburization, whereas Endogas minimizes that tendency.

Rings, Washers and Strips—Fig. 1 shows a group of assemblies comprising stamped and screw machine components being fed into one of the continuous copper brazing furnaces on its wire mesh belt conveyor. In this case, short lengths of copper wire are placed next to the joints to be brazed. Copper rings, washers, strips and paste are also used in many instances. Parts about to be brazed are components of a manifold used to convert household coal furnaces to gas burning. Cast and forged parts formerly screwed together have now been converted to the components shown and are brazed with some 24 per cent over-all saving in cost.

Fig. 4—Making silver soldered joints between copper springs and brass plates in a four-place fixture of dielectric material, the fixture being held successively by hand in each of four positions



The parts shown in Fig. 2 include drawn steel covers to which two cast iron elbows and three short bushings are brazed. Good joints result, but for even greater cost reduction plans now call for substituting a kind of wraparound elbow made from sheet metal to which end bushings made in the screw machine are added. The joints in these elbows are to be brazed at the same time the elbows are brazed to the stamped cover. This will make a lighter assembly.

Many customers are finding that assemblies made from stamped and screw machine components copper brazed or silver soldered together cost noticeably less than any other types of construction. Punch press and screw machine frequently are the lowest cost producers for metal parts, while the brazing or soldering operation is economical. Quality is not reduced, because properly copper brazed joints have strength practically equal to that of the parent metals, while silver soldering meets strength requirements.

Simple Fixture Used—Fig. 3 shows a fairly typical part silver soldered by induction heating. The assembly includes two of the box-like end fittings that are first copper brazed in the continuous furnace shown in Fig. 1. A tube joins these two parts, the joints being bonded by silver soldering while the components are held in a simple fixture that insures correct relative positioning. Although the same joints could be furnace copper brazed, it would be hard to hold the parts in correct relation unless many fixtures were made at considerable cost. When joints are silver soldered one at a time, only a single inexpensive fixture is needed and yet the joints are rapidly made and strength is adequate.

Although most silver soldering in this plant is done on steel parts, other work includes nonferrous parts such as are shown in Fig. 4. In this case, a coiled copper spring is joined to a brass plate by induction heating in a Tocco Jr. machine, using a four-place nonmetallic fixture to hold the parts in correct relative position, with a washer of silver alloy between each pair of fluxed surfaces to be joined.

Only a single induction coil is used. The fixture, held by hand, is moved into positions such that each assembly is brought successively into correct heating location and remains there until the solder is melted. Two fixtures are used alternately. One girl loads the second fixture while another does the soldering in that previously loaded. Copper brazing could not be used in this case because the parts would melt at the high temperature required. With silver alloy and induction heating, however, the solder is melted and only the last turn of the copper spring is heated and annealed, the other turns retaining work hardness.

Setups Flexible—Jobs are constantly changing and involve wide differences in quantities per lot. The setups are flexible, however, and can be adapted to almost any production brazing within the capacity of the equipment available.

The company maintains an engineering department for development of brazed redesigns. Assemblies are sold either as finished units or handled on a commercial jobbing basis.

By GUY HUBBARD
Machine Tool Editor

Seen and Heard in

The Machinery Field

CUT OUT NON-ESSENTIALS: There is growing conviction among machine tool men, pressured from all sides for quicker deliveries, that things could be speeded up considerably if customers would order only those attachments and accessories which actually are required for defense work.

One who subscribes to this belief—and who is trying to do something about it—is Sir Alfred Herbert, a leading British machine tool builder. He contends that much of the extra equipment, ordered more or less through force of habit, never is used.

He goes on to say: "Perhaps the most glaring instance is the fact that practically all center lathes are ordered with sliding, surfacing and screw cutting equipment. If an investigation is made in any well-equipped work shop, I doubt whether one lathe in fifty will be found making use of its lead screw, change gears and other adjuncts. The position is much the same with capstan lathes. Chasing attachments almost invariably are specified but are used only once in a blue moon.

"Universal milling machines are of course necessary for some tool room work, but the proportion of universal mills ordered is unnecessarily high. Many are engaged on jobs far more suited to plain milling machines. Elaborate dividing heads and other costly equipment often are kept idly in store.

"It is of course quite good fun to build elaborate machines—when there is lots of time to do so—but under today's conditions time is the one thing above all others that we ought to save."

In the most critical period of World War II, an American machine tool builder showed me engine lathe orders—which had been cleared through Washington—covering equipment for shell manufacture in Russia. Although the work was relatively rudimentary, the Russians not only ordered about everything in the book, even backing-off attachments, but also in many cases ordered duplicate sets.

Reaction of the builder was that either they were laying the groundwork for postwar conversion or were setting the stage for postwar copying of our equipment. Whatever the reason, it imposed a wholly unwarranted burden on our machine tool industry.

Now that a machine tool emergency again is involved in a new defense program, every ounce of unnecessary fat should be cut out of domestic machine tool orders before they are placed with our hard-pressed builders. Production men can do this. Bureaucrats can't.

AUTOMATIC GUARDS: Transparent plastic guards on production machine tools virtually are a "must" with carbide tooling, especially when coolant is used. Flying chips always are hazardous, but those projected from 1200 feet per minute cuts are almost as dangerous as pistol bullets.

The problem is to design guards which will not slow down floor-to-floor time. One answer seems to be pneumatically-operated sliding guards tied in with the machine cycle. These guards snap shut when the starting button is pushed. They pop open the instant the cutting cycle is completed.

Such automatic guards are in successful use on some of the latest automatic lathes and gear hobbing machines. As their use spreads, production efficiency will go up and industrial accidents will decrease.

PRECISION ON PRODUCTION: Many an instrument and many a machine which—25 years ago—could be found only in the sanctum sanctorum even of the finest of machine shops, today can be found in action on the production lines. Typical of the kind of equipment which has escaped from behind locked doors and gone to work in the shop, are the so-called jig borers and some of their relatives which do precision milling, grinding and precise hole spacing.

There are several reasons why these machines are so widely used. One reason is that limits on production work today in many cases equal or surpass limits demanded on jig, fixture and special tool work of only a few years ago. Another reason is that tooling costs, in particular for jigs, fixtures and special holding devices, have increased to such a degree that sidestepping them becomes a vital economy move. This is true especially on limited lot production.

Still a third and very important reason is that American ingenuity and American skill have been applied to a field once largely dominated by foreign interests. This has resulted in development of superprecision machines rugged enough to stand the gaff of regular machine shop use, simple enough to permit their operation by ordinary skilled mechanics and cheap enough so the average shop can afford to buy them. The foreign machines of course still are in the picture but they certainly are not dominant as they were.

It is significant that American machine tool builders themselves were among the first to realize the value of jig borers, "jigmils" and jig grinders on production work and were among the first so to apply them. One reason was that top quality gears used in modern machine tools demand precision mounting in headstocks, frames and gear boxes. Another was that customers today demand strict interchangeability in machine tool parts—something which they did not always get in the not-so-good old days. A third was that customers today demand accuracy in machine tools which is difficult to hand down through the medium of jigs and fixtures. At the same time they don't want to pay fabulous prices for this accuracy.

These same conditions confront more and more manufacturers of more and more products in many other fields. More and more of them are finding that precision machines on production meet these conditions successfully.

Electronic Scale Simplifies

With the advent of Streeter-Amet's new electronic equipment industrial weighing can now be an easier, more exact and less time consuming operation

AN ELECTRONIC scale and recorder developed by Streeter-Amet Co., Chicago, is an innovation in the weighing field, although its various components have been in existence for some time. Company engineers claim that compactness and ease of installation, operation and maintenance of the new unit make it extremely useful on industrial weighing operations, dormant or active.

Introduction of the electronic scale simplifies an operation necessary in virtually every industry. In the past, much effort has been put forth to simplify the measurement of other physical quantities while the weighing industry has remained more or less standard in its methods.

Records At Remote Points—Another feature of the scale is its ability to record and print weight information at some remote point. This allows the information to be received at any convenient place.

There are a wide number of applications for which it is well suited. Weighing raw materials and finished products in steel mills, motion weighing of railroad cars and motor trucks, and various mine weighing operations, are but a few of the possible applications.

Development of the scale's components began during the middle 1930s, with introduction of the first servo-operated step cam system and recorder. In 1939 the bonded electrical resistance strain gage was developed by Ruge and Simmons. A further development utilizing this strain gage is the Baldwin-Lima-Hamilton load cell. Through extensive research and engineering, the instrumentation necessary for utilization of the load cell was developed by Streeter-Amet.

In the cell, a strain gage is bonded to a calibrated load receiving column. Inside the cell is a wheatstone bridge having as one leg, the strain gage. A deflection of the load receiving column due to a load on the cell causes a corresponding deflection of the strain gage. An electric current is passed through the wheatstone bridge and deflection of the strain gage changes its resistance and causes a change in voltage across the bridge.

Compensates For Temperature Changes—The cell includes temperature compensating resistors to compensate for the change in physical characteristics of load receiving column when a temperature change occurs. A rise in temperature will cause a greater deflection for a given load and these resistors compensate for this change. During violent temperature changes slightly erratic readings may be noted. However, once the cells have reached a steady-state condition, the cell will resume its normal operation. Whenever violent temperature changes are anticipated, provision is made for insulating the load cell which eliminates this period of inaccuracy.

Like any instrument, these cells may be damaged by misuse. They are designed to operate at 120 per cent of capacity without damage to the cell or a shift in the zero position. Loads up to 150 per cent of capacity may cause a slight zero shift but will not damage the cell unless frequently encountered. In installations where impact loading is anticipated, provision must be made to cushion the force of impact and keep it within 120 per cent of cell capacity.

Instrumentation for the electronic scale provides a means of converting the electrical output of a load cell to mechanical energy by which the force exerted on the load cell may be recorded and printed.

When a force is introduced on a load cell, output voltage from the strain gage is fed to a balancing bridge arrangement having as one leg a variable resistance. This system is initially in electrical balance. Introduction of the voltage across one leg of the bridge causes an unbalanced condition. Difference in potential thus produced is directed into an amplifier. From the amplifier the voltage operates a servo balancing motor which causes a precision potentiometer, or the variable resistance to rotate until the system is once again in balance. Simultaneously, with balancing of the circuit, the motor is also operating the recording apparatus. This circuit is phase sensitive and removal of the force from the load cell causes the motor to reverse its direction of rotation, bringing the potentiometer back to its original position.

Recording Apparatus Described—The recording apparatus consists of a series of step cams which convert rotational information from the servo motor to digital information on the printer.

The step cams are positioned at a point proportional to the weight on the scale and when a print is desired, a switch is closed which activates the printer motor. A set of fingers are moved into position on the step cams by means of a cam working off the printer motor. The fingers are directed into the correct step by means of correlating and step-over disks.

Two correlating disks and one step-over sensing disk are used to accomplish this. The fingers are moved into place in a definite order. When the step cams are positioned one sensing finger moves into the high-speed correlating disk which controls the positioning of the high-speed step cam. If this cam should be slightly out of position, the sensing finger meshing with the correlating disk will bring it to the correct position. The step-over sensing disk operates off the same shaft as the high-speed correlator and thus is positioned at the same time. This step-over disk positions the low-speed correlator which in turn positions the low-speed step cams.

The step-over mechanism functions during the second half-revolution of the high-speed cam. While

Weighing Operations

the high-speed correlator is making one revolution which is equivalent to 100 pounds, the slow-speed correlator moves one tooth. During the increment from 50 to 99 pounds, the sensing finger would mesh with the wrong tooth if some provision were not made to bring the correlator back to the correct point. This is accomplished by a precessing finger, operating in parallel with the step-over sensing finger, which mechanically forces the low-speed correlator back to the correct position.

When the correlating and step-over fingers are in position, fingers which operate the typewheels are moved into place.

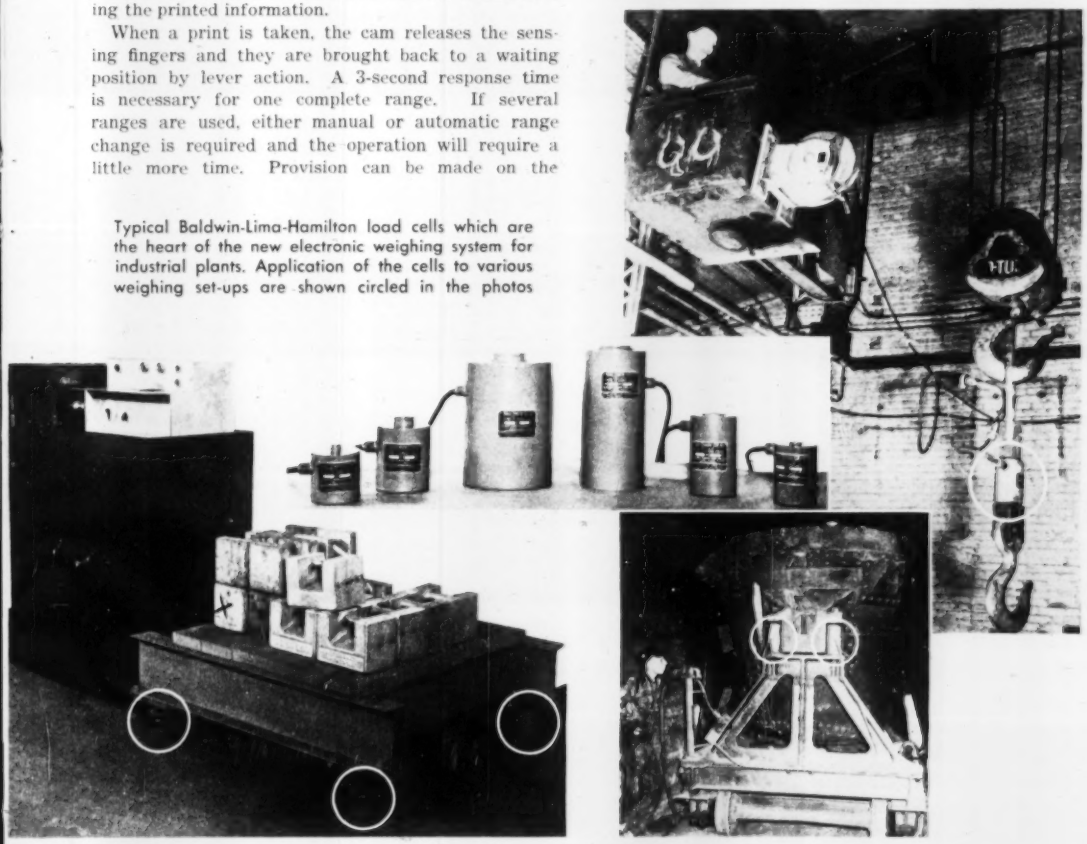
Stamp Actuated by a Cam—Attached to each of the fingers is a rack which meshes with a pinion on each of the small typewheels. When these are correctly positioned, a second cam actuates the stamp which is forced against the tape and typewheel, giving the printed information.

When a print is taken, the cam releases the sensing fingers and they are brought back to a waiting position by lever action. A 3-second response time is necessary for one complete range. If several ranges are used, either manual or automatic range change is required and the operation will require a little more time. Provision can be made on the printer for printing on a card, ledger sheet, tape, or any suitable medium.

If at any time, a zero shift takes place; that is, a recorder reads other than zero when there is no load on the scale, it may be corrected by means of a built-in zero balance control. This control consists of a hand operated helipot in series with the balancing potentiometer in the wheatstone bridge. The bridge may be balanced by manual manipulation of this helipot and a zero reading obtained.

Easy To Change Range—Another feature is the range change control. On a large capacity scale, rather than using one range from zero to capacity, it is desirable to break this into several smaller ranges and obtain a more compact mechanism which can be read with closer accuracy. Changing from one range to another is accomplished by adding a resistance in series with the helipot equal to that of the helipot which balances the system and brings the recorder back to zero with the preceding load still on the scale.

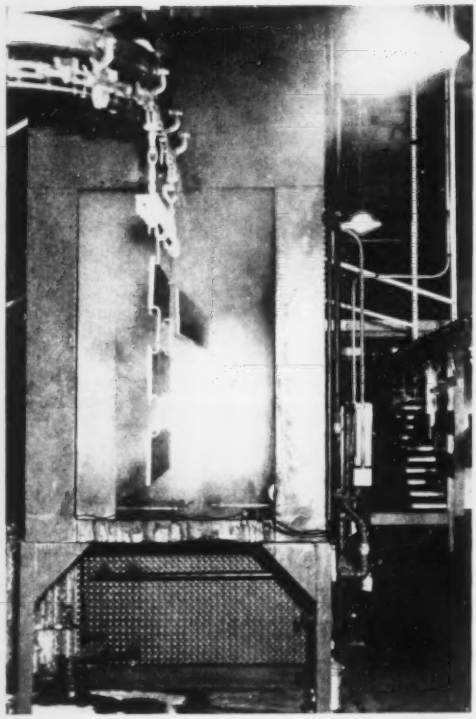
An electronic weighing device, company engineers point out, is an economical system. This is particularly true for high capacity systems. The recorder and servo system is essentially the same for large or small capacity installations and there is a slight decrease in cost of the lower capacity load cells.



Typical Baldwin-Lima-Hamilton load cells which are the heart of the new electronic weighing system for industrial plants. Application of the cells to various weighing set-ups are shown circled in the photos

VERSATILE

Overhead conveyors carry sheet steel parts through spray cleaning, phosphating, drying, paint spraying and baking areas. Paints circulate continuously from tanks in mixing room



Above—Sheet metal parts leaving tunnel in which they are cleaned and given phospate treatments to promote good adhesion of finishes and to inhibit rust

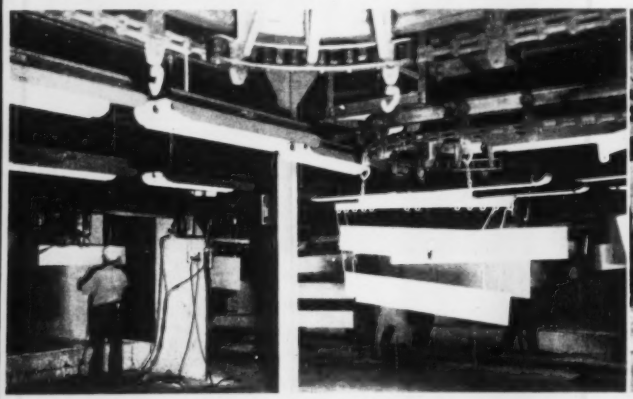
Below—Portion of finishing department showing one primer spray booth at left and an enamel spray booth at right. Baking in overhead ovens (not shown) follows each coat

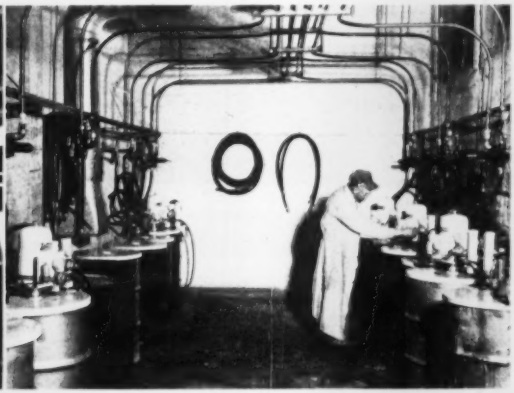
Below, right—In this room, tanks are arranged in pairs, one for mixing and one for continuous circulating of paints through closed circuits to spray guns at booths. Pumps at each tank are air-operated

EQUIPMENT produced by Stewart-Warner for Alemite lubrication systems is fabricated largely from sheet steel in Chicago plants of this company. Nearly all components require an applied finish, usually synthetic enamel, with or without a primer coat, either before or after assembly. An unusually fine finishing setup does this work.

Products ready for finishing are hung on an overhead chain conveyor that runs through the assembly department and finishing areas and generally remain on the chain until finishing is completed. Any sanding or polishing is done before the parts reach the conveyor that carries them through the cleaning and phosphating tunnel. The chain moves at 8 feet per minute.

Sprays from All Angles—In this tunnel, parts are subjected to sprays from all directions. In the first section the spray is an acid-phosphate cleaning solution heated to 160-180° F. After doing its work the solution drains back to the tank below and is recirculated. This treatment takes 1 minute. It is followed immediately by a 54-second rinse in water heated to 160-180° F. In the third stage, an acid neutralizer at 140-160° F is sprayed on for 45 seconds. This tends to prevent rusting. After draining, the parts continue on the conveyor through an overhead drying oven in which they remain 4 minutes at a temperature of 340° F. After leaving the oven, the parts enter the pressurized finishing room and cool to about room temperature. Unless dip coating is done, parts next enter the first spray booth. All booths are water-curtain type, the overspray being caught by the curtain but not recovered subsequently. Excel-





FINISHING SYSTEM

Speeds Manufacture of Lubrication Equipment

By RALPH SCHIRMER
Plant Engineer
Stewart-Warner Corp.
Chicago

lent ventilation is provided. All air fed into the finishing room is filtered. Since 25 per cent more air enters than is exhausted from spray booths, there is outflow from all other openings including those where parts enter and leave the finishing room.

15-Foot Booths—Two booths 15 feet long are used for prime coating and two of the same size for finish spraying, each booth having two spray stations. Primer used is either white or gray, depending on the enamel coat to follow. Upon leaving the primer booth, the prime coat is baked 11¼ minutes at 330° F in an overhead oven.

After parts cool, they enter finish spray booths for enamel coating. Several lines through which enamel of different colors is circulated pass through each station at each booth, there being one gun for each color at each station. When necessary, the lines are flushed out with solvent and the color is changed, being stored for use with that color at a later time.

When specified, a one-coat hammer-tone finish is applied, the spray gun feeding solvent as well as pigmented enamel to yield the mottled effect required. Whether hammer-tone or plain color enamel is used, the coated parts enter another overhead oven and are baked for 11¼ minutes at 320° F. From the oven, parts go to inspection, and, where needed, to stations where decals are applied.

Some frames and interior parts not normally exposed to view in service do not need priming but receive a single coat of black varnish enamel that affords adequate protection. These parts are shunted directly to finish spray booths and do not go through primer booths or primer baking. All ovens are gas-fired, are well insulated and have recirculating ducts to provide uniform heating. Safety arrangements include purging of ovens with air before relighting.

Paint Circulates Continuously—All paints are supplied to paint booth spray stations through eight 1-inch seamless pipe lines connected to circulating tanks in the distributing room. For each line, there is a mixing tank equipped with an air-driven agitator and a transfer pump that feeds oil into the circulating tank for this line. From the latter, a pump keeps the paint circulating continuously to spray stations and back to the circulating tank, solvent being added as needed to maintain specified specific gravity.

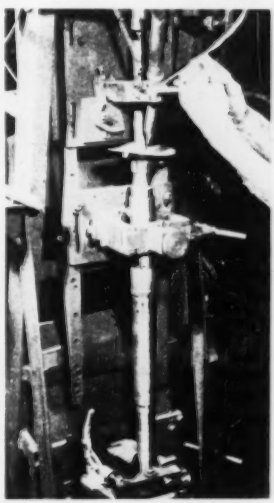
Paint supply pressure is 40 psi but this is reduced to 20 psi at guns. Air for spraying is fed from a common line at 60-65 psi to primer guns and 63-75 psi for finish coat or enamel. There is an air regulator at each gun. The pumps are air driven and deliver about 3½ gpm or enough to supply five guns. An air-operated pump transfers paint and solvent from drums to mixing tanks and from each such tank to each corresponding circulating tank. All tanks for mixing and circulating paint are in a separate building; pipes pass through an insulated duct to the paint room.

Welded Extension Saves Shaft Stock

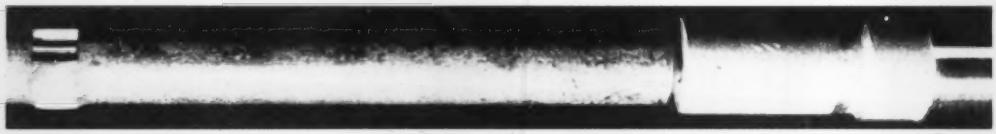
BY WELDING a slender 1⅛-inch diameter extension to an armature shaft turned from 3⅛-inch stock, rather than turning down the small diameter extension from the rough stock, Lincoln Electric Co. saves 25 pounds of shaft stock per armature. The welding is done with semiautomatic hidden arc welding, two passes giving complete penetration plus sufficient weld build-up to permit final machining of the weld.

Extension Chamfered—The shaft extension is chamfered and fits into the centering hole in the shaft providing a V-groove for the weld. The shaft is held vertically and revolved at a speed of 7 rpm, a cupped flux dam holding the granular flux around the weld area. The 5/64-inch diameter electrode wire is fed to the V-groove at an angle approximately 30 degrees to the shaft. Two passes are made without stopping, using a current of 400 amp. The weld, 1⅛-inch in diameter is made in 15 seconds. After welding, the shaft is straightened to within two-thousandths which requires approximately 1 minute.

The high current density of the hidden arc weld-



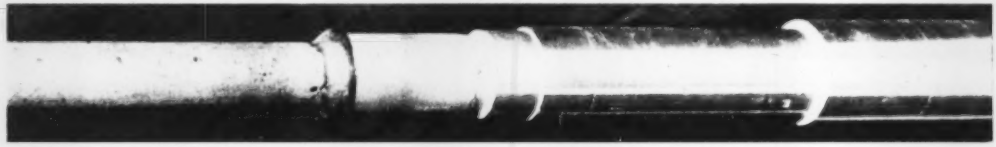
Shaft is held vertically and revolved in this setup at 7 rpm. A cupped flux dam holds the granular flux around the weld area. Two passes are made without stopping



Shaft extension is chamfered and fits into the centering hole in the shaft providing a V-groove for the weld

ing process gives a penetrating arc which makes this type of welding application practical. With regular hand welding the amount of scarfing required to secure adequate penetration would necessitate a large number of beads to fill up the groove—too many to be economical.

Machining Time Cut—In addition to saving the 25 pounds of metal which previously were turned to chips, welding the shaft extension has introduced other savings. When machined without the extension, the shaft is more rigid and the roughing cuts can be made to full depth and at high speeds. Machine time has been reduced for these rough cuts approximately 60 per cent, while finishing cuts have been reduced 40 per cent.



Weld 1⅛-inch in diameter is made in 15 seconds. After welding, the shaft is straightened in about 1 minute to within 0.002-inch

Fuel Tanks Stretch-Formed Faster In Expanding Rubber Die

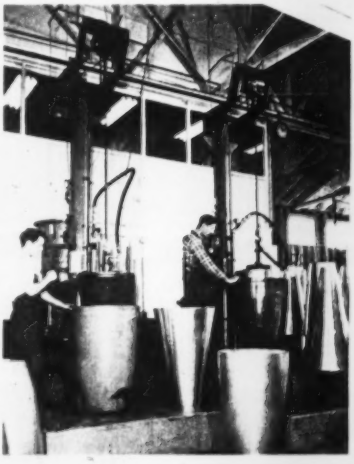
MASS production of jettisonable fuel tanks for U. S. Air Force jet fighters, using a new method of metal forming, is underway at Vic Pastushin Industries Inc., Los Angeles. Savings in time of 85 per cent and in costs of 75 per cent are realized by its new Demarest metal forming process—according to Victor F. Pastushin, president. The process uses an elevating mechanism and an expanding rubber die.

Developed primarily to form jettisonable fuel tank sections, the process stretch-forms steel or aluminum cones and cylinders into forms with spherical contours such as cowlings, propeller spinners, missile casings and practice bombs.

In forming by the process a seam-welded sheet-metal cone is placed inside a Meehanite die holder weighing 3500 pounds. A rubber forming die is lowered into the cone and expanded hydraulically at 400 psi pressure. Expansion of the rubber die stretches the straight-sided cone into a curved part. According to Pastushin engineers, formed parts are free of wrinkles and tool marks and are uniform in skin thickness. Parts require no degreasing and setup time is very low.

Left—A blank—a rolled and Heliarc seam-welded cone—is fitted inside Meehanite die as first step in forming 230-gallon jettisonable fuel tanks by the Demarest process

Right—With steel lid locked, the rubber forming die is expanded by 400 psi fluid pressure to form fore and aft sections of fuel tank



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THINK OF THE SAVING IN A TON!

HOT METAL CARS AND MIXERS

• • • *Test Results As a Guide to Lining Selection*

The experiences of several steel companies with various types of refractory materials will prove helpful in keeping your equipment in service longer. Unburned magnesite - chrome brick, used in mixers for campaigns up to 19 months are suggested for use in lining hot metal cars

PART IV

By R. P. HEUER
Vice President

and

C. E. GRIGSBY
Service Research Engineer

General Refractories Co
Philadelphia

IN RECENT years, sillimanite brick have been installed in the most severe sections of several mixers. Results which have received most publicity are those in a 1000-ton mixer where metal temperature is only 2250° F, lining is water-cooled and fireclay brick have given over 600,000 tons. After four years experience with sillimanite brick and large shapes, it was concluded that the brick more than paid for themselves through savings in material and labor costs. Two other plants of this same company tried sillimanite brick in their mixers, with no conclusive results.

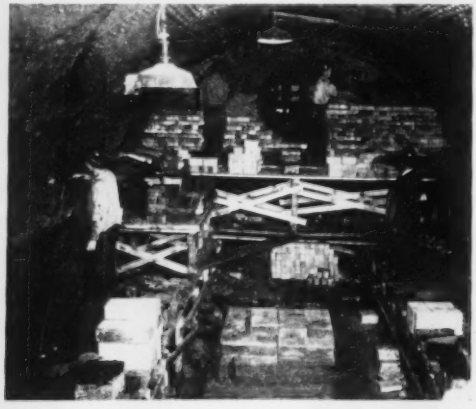
In a 500-ton mixer handling 2400 tons per day at another company, a sillimanite lining was still in service after giving more than three times the life of the previous lining material.

In a 1300-ton mixer at a third company, conditions are extremely severe, and a sillimanite brick lining gave results which were good enough to justify another lining of this type of material. The second lining gave only about two-thirds the service of the first. It is now believed that high-fired super-duty fireclay, or unburned magnesite-chrome brick, laid with chrome-magnesite mortar, may prove more economical than sillimanite brick in this mixer.

A fourth company found that in mixers of 750 to 850 tons capacity, where slags were unusually high in oxides of iron and manganese, high-duty fireclay brick linings averaged only 80,000 tons, despite the fact that mixer temperature was kept below 2200° F. By using a panel of high-fired super-duty fireclay brick in the most critical area under the pour-in hole, lining life was increased to 100,000 tons. The panel of high-fired super-duty brick was then replaced with sillimanite brick with the result that the lining gave 150,000 tons. It was then concluded that the improved brick tested were not justified for complete mixer linings. Because it is desired to increase temperature of the mixer above 2200° F, a band 6 to 8 feet wide of unburned magnesite-chrome brick, laid in chrome-magnesite mortar, has been installed in the slag line area. After about 200,000 tons, wear appears negligible.

Unusual Lining Practice—A fifth company, outside the United States, is using a 13½-inch working lining of sillimanite brick backed up by 13½ to 18 inches of burned magnesite-chrome brick in an 800-ton mixer.

Fig. 12—Lining a 1350-ton mixer with patented unburned magnesite-chrome brick laid in chrome-magnesite mortar



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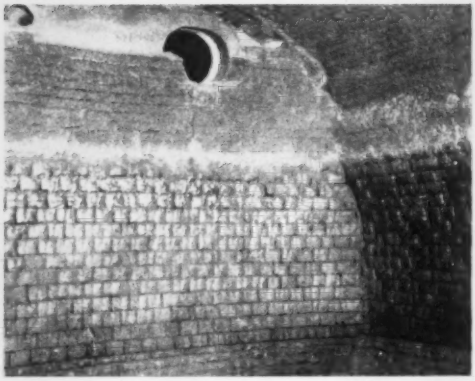


Fig. 13—Unburned magnesite-chrome brick laid in chrome-magnesite mortar after twice the average life of high-duty fireclay brick in a 600-ton mixer. Final tonnage was more than 6½ times that of fireclay brick

This mixer handles 1325 net tons per day and metal temperature is reported to be 2450 F. The sillimanite brick lining gives about 250,000 tons.

This burned magnesite-chrome brick was previously tried as the working lining, but was not successful because of abrasive wear along the metal line. Basic back-up brick is carried 9 inches above the maximum metal line, and above this is 27 inches of silica brick, and a 13½-inch silica brick roof. The pouring-out spout is lined entirely with magnesite-chrome brick. This particular combination is dictated by local conditions, and delivered prices of brick.

There is good reason to believe that below the slag line, chemically bonded magnesite-chrome brick, laid with chrome-magnesite mortar and backed-up with fireclay brick, would give materially longer life and reduced refractories cost per ton of metal. Semisilica or spall resistant silica brick could be expected to duplicate, or excel, the roof life obtained with regular silica brick, without danger of spalling.

Economy of Sillimanite Questionable—A sixth company has tried sillimanite brick in mixers in two different plants—in one of which, they were no more economical than regular Kentucky blast furnace brick. This plant is considering a trial of high-fired Kentucky (Cone 18) blast furnace brick. In the other plant, sillimanite brick were better than the dense, stiff-mud Kentucky high-duty fireclay brick surrounding them, but were not enough better to make them economical. Consequently, a lining of unburned magnesite-chrome brick, laid in chrome-magnesite mortar, is being considered—since they cost only about ⅓ as much as sillimanite brick and will probably last much longer. Still another company tried sillimanite brick and considered them a failure. Thus, as in hot metal cars, results on sillimanite brick in mixers are variable. When mixer temperature is low, they are sometimes economical for the more severe sections, but where really hot metal is being handled, critical temperature of the brick and slag are apparently exceeded (as is to be expected). In such cases sillimanite brick are usually not economical. Users of sillimanite brick should be careful about using sodium compounds around the spout, as it causes rapid wear and may produce local failures.

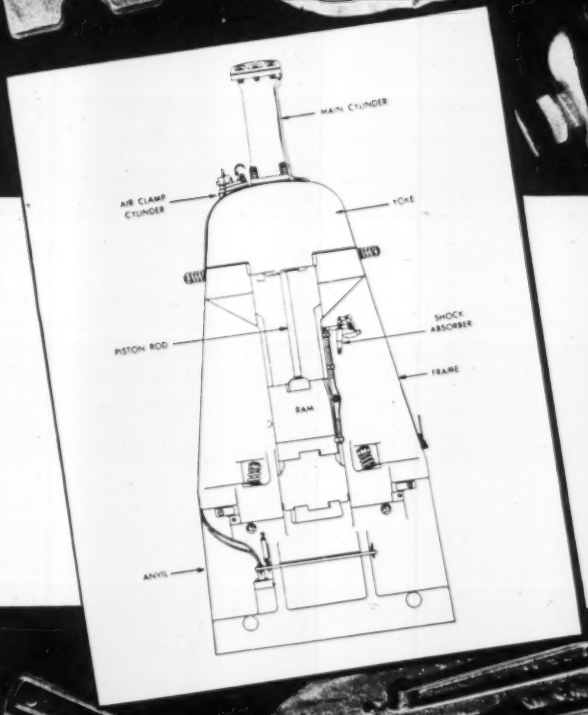
New High Alumina Brick Promising—There are several new, low porosity, high alumina brick of diaspore or bauxite base which should prove economical in some mixers. A recent trial of dense, 70 per cent alumina brick, of diaspore base, in a 1300-ton mixer where conditions are very severe, showed considerable promise, and more extensive trials with high alumina brick will be made. There is every reason to believe that brick of 70 per cent alumina content, or higher, are likely to prove economical in many mixers where conditions are not sufficiently severe to require basic brick.

Variable Results with Silica—Results with silica refractories in hot metal mixers vary widely with the type of refractory and service conditions. There has been a considerable use of natural silica rock in mixers. One of these—mica schist—is used in several mixers for inner linings, but sandstone is rarely used. Both are used in the arches over the pouring-out spout. In the 1500-ton mixer previously described, where mica schist lasted but two to three months, a lining of high-fired super-duty fireclay brick, laid in sillimanite mortar was still in service after 18 months. This was 7.2 times the average length of service of mica schist. As in hot metal cars, natural silica rock will not do the job when conditions are severe.

Regular silica brick are used successfully in arches over the pouring-out spout in some mixers, and the foreign plant previously described as having unusual lining practice, has used nothing but silica brick for upper side walls and roofs of mixers for more than 20 years. This plant considers them better for these sections of mixers than fireclay brick, and state that they last at least five years or more.

In another plant, silica brick were tried as an inner lining in one mixer, with no better results than fireclay brick—despite the high resistance of silica brick to moderate amounts of iron oxide. Since there was some spalling around the spouts in this test, a spall resistant silica brick will be tried, because of its extra spall resistance, and its tendency to expand in service. In one plant, where high-duty fireclay brick gave an average of nine months service in the mixer roof, the spall resistant silica brick gave about three years service—four times the average life of the fireclay brick—despite the fact that during this time the mixer was shut down cold several times. Another plant has used the spall resistant silica brick to replace super-duty fireclay brick in extreme upper side walls of mixers, with such good results that they were also put in the roof to replace Jersey semisilica brick.

Basic Refractories in Mixers—In the past 20 years, practically every type of basic brick has been tried in hot metal mixers. Unburned magnesite-chrome brick, Ritex-A, made by a patented process and laid in a patented chrome-magnesite mortar, have given most economical service where service conditions are



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Effect Of Temperature Control (2200-2250° F)
Results Over 8-Year Period

	Number of Campaigns	Average Tons Per Campaign	Average Days Per Campaign	Average 9-inch Equivalents Per Repair	Average 9-inch Equivalents Per Ton	Average Tons Per Day
Before temperature control	9	470,275	170	33,065	0.0702	2770
After temperature control	6	728,491	232	35,661	0.0489	3140
% increase due to lower temperature		54.8	36.4	8.0	30.3 (Decrease)	13.3

unusually severe. The following data on four plants using these brick, show how they perform under such conditions:

A large steel company, at one plant, has been using a lining of these brick in a 1350-ton mixer for the past 20 years. Previously, Kentucky high-duty fireclay brick were used. Several experiments were made with various combinations of refractories, and the unburned magnesite-chrome brick noted above were chosen on the basis of performance.

In December, 1946, control instruments were installed to keep the temperature between 2200° and 2250° F. Average results of 15 campaigns during an 8-year period are shown in the accompanying table. Use of basic brick increased length of campaign about fourfold. Figs. 12 and 14 show this 1350-ton mixer in various stages of relining.

Mortar is poured on the bed joints and worked into the vertical joints as the brick are laid. No expansion joints are provided in either direction. Thick mortar joints wash out rapidly. The mortar compresses about 50 per cent due to the brick's expansion under heat. In thin joints, mortar density approaches that of the brick; if too thick, the center portion is not dense enough and the joint washes out in a short time. Experience has shown that thin joints last 6 to 9 months, while thick joints give approximately 2 months service at this plant.

Some Basic Brick Unsatisfactory—At another plant, this same brand of brick has been used in a 1200-ton mixer since about 1940. Previously, a high-duty, hard-burned fireclay brick was used, and due to extremely severe conditions, an unusually low tonnage, averaging about 10,000 tons per campaign, was obtained. Burned chrome brick gave 24,000 tons and burned chrome-magnesite brick 39,000 tons. The first unburned magnesite-chrome brick lining gave 64,000 tons—a low figure as mixers usually go, but still more than six times the average life of fireclay brick. All of these results were with no major change in operating conditions or mixer design. After the first run on the magnesite-chrome brick, the design was changed so the metal pouring in did not hit the brick. Lining life doubled immediately, and in the past eight years has gradually increased, due to other improvements in operating conditions. A recent campaign gave 386,000 tons and another 371,000 tons. These unburned basic brick are also used as a lining material for an 800-ton standby mixer in this plant.

Unburned Basic Brick Used — Another company uses these unburned magnesite-chrome brick in an 800-ton mixer—operating temperature 2420 to 2500° F—in which conditions are so severe that each of two brands of high-fired super-duty fireclay brick gave less than three months service at the slag line. For the one used most, repair to repair time averaged 86 operating days at 780 tons per day, for an average of 67,000 tons.

An 8-foot 6-inch band of basic brick at the slag line, increased lining life to 13 months, and 386,838 tons of iron at 1050 tons per day, with but minor repairs. On the basis of that performance, a complete basic brick lining was installed from skewback to skewback. That campaign started Sept. 26, 1948, and after 277,000 tons, the lining was in excellent condition, Fig. 11. Fifteen months later tonnage was 450,206, and average tons per day was 1040. Up to that time, the mixer had been down twice for minor repairs to the jambs and spouts. The campaign ended in 19 months with a total of 560,664 net tons put through the mixer. Average rate of operation of the mixer was 980 tons per day for the 571 days elapsed time. Thus, the basic brick gave more than 8 times the average tonnage, and nearly 7 times the length of service of the two brands of high-fired super-duty fireclay brick. Furthermore, this was accomplished without any major repairs—compared to an average of five major repairs per campaign with super-duty fireclay brick.

Unburned Basic Brick In Mixer Abroad—A foreign plant had been using high-duty fireclay brick in a 600-ton mixer operating between 2280 and 2460° F, handling basic iron. In 37 months, 20 partial repairs were made, with a loss of 140 days. Thus, average lining life between repairs was less than 2 months, average tonnage per lining was 11,800, and time lost per repair averaged 7 days. Unburned magnesite-chrome brick were first installed as a band 5 feet 3 inches high at the slag line. After about 3½ months service—twice the average life of high-duty fireclay brick—the basic brick appeared as shown in Fig. 13, and minor repairs were made. The brick then gave about 3 months more service without further repairs—thus giving 6½ months service, or about 3½ times the life of high-duty fireclay brick. Tonnage was about 78,000—more than 6½ times the average for fireclay brick—because daily tonnage was virtually doubled with the basic brick. In the next lining, the basic brick band will be increased to 7 feet 6 inches high, because the service given by these basic brick was "very much better" than that obtained from high-duty fireclay brick. Altogether, these basic brick are considered highly satisfactory, and are now the standard lining in this mixer.

No Failures of Unburned Magnesite-Chrome—There has never been a failure of these unburned magnesite-chrome basic brick in mixers, and no one has reported any unusual damage from use of sodium compounds in spouts. Where conditions in mixers are too severe for any other refractories, unburned magnesite-chrome brick (Ritex-A), laid in chrome-magnesite

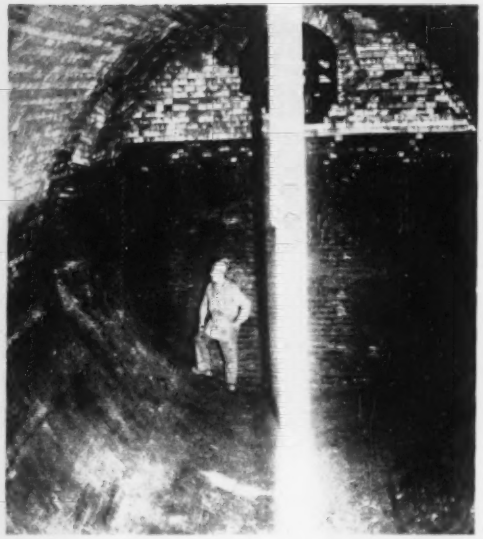


Fig. 14—A 1350-ton mixer lined at the slag line and below with patented unburned magnesite-chrome brick laid in chrome-magnesite mortar

mortar can be expected to give an outstanding reduction in cost per ton of metal. There is reason to expect similar results in hot metal cars.

Chrome and Chrome-Magnesite—Chrome brick are available only as burned brick. They are inferior to all other basic brick in resistance to hot metal mixer slag, and almost as sensitive to spalling as burned magnesite brick. Results in several plants, on both burned and unburned chrome-magnesite brick, have indicated that they are greatly inferior to magnesite brick and magnesite-chrome brick in mixers.

Magnesite Brick Resist Chemical Attack—Magnesite brick have the best resistance of any basic brick to chemical attack of hot metal mixer slags. Standard burned magnesite brick, of both regular and coarse grind, have not been successful in mixers because of spalling. Low-iron burned magnesite brick have given fair results in a few cases. In other cases they have been no better than fireclay brick. Generally speaking, they are unsatisfactory where there is any moving action of the metal (which causes pencilling). A test panel of these brick, in one mixer, was not nearly as good as unburned magnesite-chrome brick adjacent to the test panel.

Unburned chrome-free magnesite brick have chemical advantages common to all brick made entirely of magnesite, and are greatly superior to any of the burned magnesite brick in resistance to thermal shock and shrinkage. One steel producer (where unburned magnesite-chrome brick have been the standard lining in mixers at one of its plants for nearly 20 years, and in another plant for 10 years), is planning a trial of unburned chrome-free magnesite brick, laid in magnesite mortar, at the slag line of a mixer to see whether or not they will give even better service than the unburned magnesite-chrome brick.

Monolithic Linings—As a result of the fairly successful use of super-duty fireclay plastic in small patches in a small unfired mixer, a 1000-ton mixer was lined with this material in the critical areas of front, end, and back walls. Height of the rammed sections was 4½ to 7 feet, thickness 6 to 20 inches, and the material was anchored to the brick with L-shaped steel. Cracks which developed during drying did not heal and became focal points for wear—and since the cracks were wide, they were worse than the joints in even the most poorly laid brickwork. After 3 weeks operation, erosion was so great that the mixer was cooled to ram the eroded areas. Examination showed considerable metal between brick and plastic, so the lining was replaced with brick. It was concluded that, while this material may be suitable for small patches, in small unfired mixers, the patch should not be more than 6 inches thick. There was no indication that the plastic was equal or superior to brick.

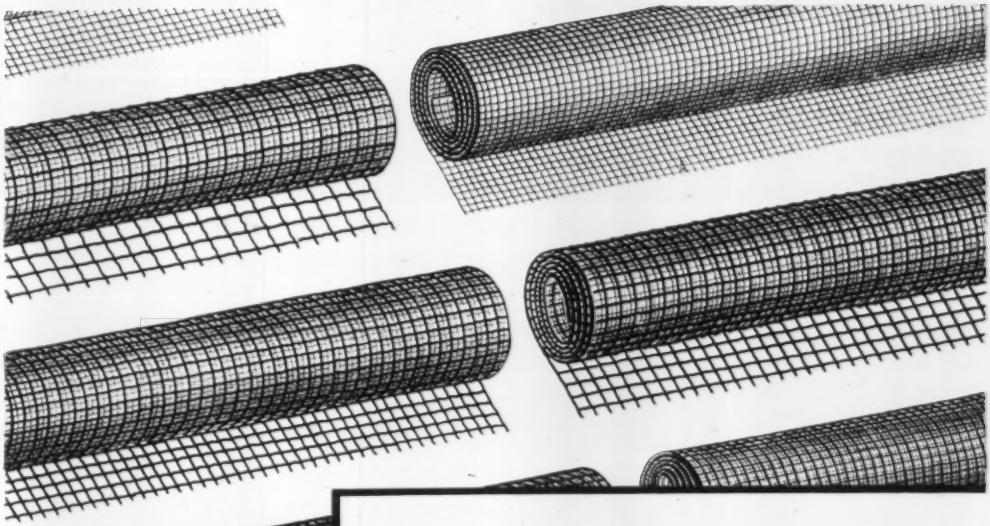
Summary—Recent results have focused attention on the superior results obtained from unburned magnesite-chrome brick in several mixers—in this country and abroad—where service conditions are too severe for any other brick. Use of these brick in mixers can be expected to expand and to be extended to hot metal cars.

Results with sillimanite brick in hot metal cars and mixers indicate that value of these brick—which cost about 35 per cent more than unburned magnesite-chrome brick—are still inconclusive. It is probable that dense brick of 70 per cent alumina, or higher, which cost less than sillimanite brick, will eventually be widely used for slag line sections of mixers too severe for high-duty, high-fired (Cone 18) blast furnace brick, or high-fired super-duty fireclay brick, and yet not severe enough to need unburned magnesite-chrome brick. Economical use of these high alumina brick in hot metal cars, where conditions are too severe for any fireclay brick, and not tough enough to need unburned magnesite-chrome brick is also probable for locations where wear is most rapid.

Meanwhile, mixers and hot metal cars, where conditions are not particularly severe, will doubtless continue to use special, low-porosity, stiff-mud, high-duty fireclay brick, laid with sillimanite or other high alumina mortar.

Manganese Recovery Studied

Development of practical methods to recover manganese in addition to sulphur and iron from Minnesota's reserves of low-grade manganese-bearing iron ore and iron sulphide deposits is being tackled by Bureau of Mines metallurgists in Minneapolis. The Bureau estimates that the Cuyuna Iron Range has about 500 million tons of low-grade formation material containing from 10 to 25 million tons of manganese. Ranging from 2 to 10 per cent in manganese, the ore has no practical value in its present state. The deposits are among the largest low-grade manganese reserves in the United States.



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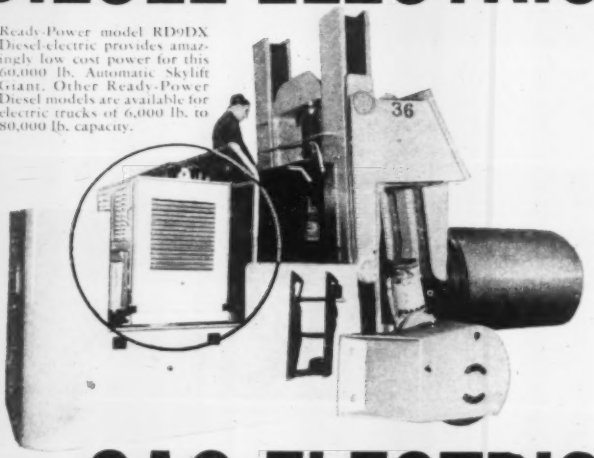
DIESEL-ELECTRIC

Ready-Power model RD9DX Diesel-electric provides amazingly low cost power for this 60,000 lb. Automatic Skylift Giant. Other Ready-Power Diesel models are available for electric trucks of 6,000 lb. to 80,000 lb. capacity.

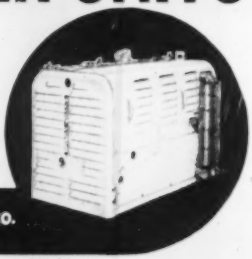


or GAS-ELECTRIC

Equipped with the new Ready-Power gas-electric model H-A, this Lewis-Shepard fork truck can be operated 24 hours a day at peak efficiency. There are gas-electric models for all makes and types of electric trucks.

READY-POWER UNITS

FOR LOW COST,
CONTINUOUS DUTY
ELECTRIC TRUCK
OPERATION



THE READY-POWER CO.

3824 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Nickel Shortage

(Continued from Page 68)

wrinkled surface after drawing, and the marks usually run parallel to the direction in which the material was rolled.

Dies designed for drawing type 302 often cause cracking when used with type 430. Larger radii and smoother dies may cure this trouble. To make a part with any severity of forming, it is well to plan on at least one more intermediate operation than would be needed with 18-8.

Bending characteristics parallel those of drawing. Type 430 cannot be bent as severely and with as sharp a radius as type 302. The outer surface of the bend may be open and superficially roughened. Furthermore, type 430 displays more pronounced directional properties than type 302, and this must be considered in planning and layout.

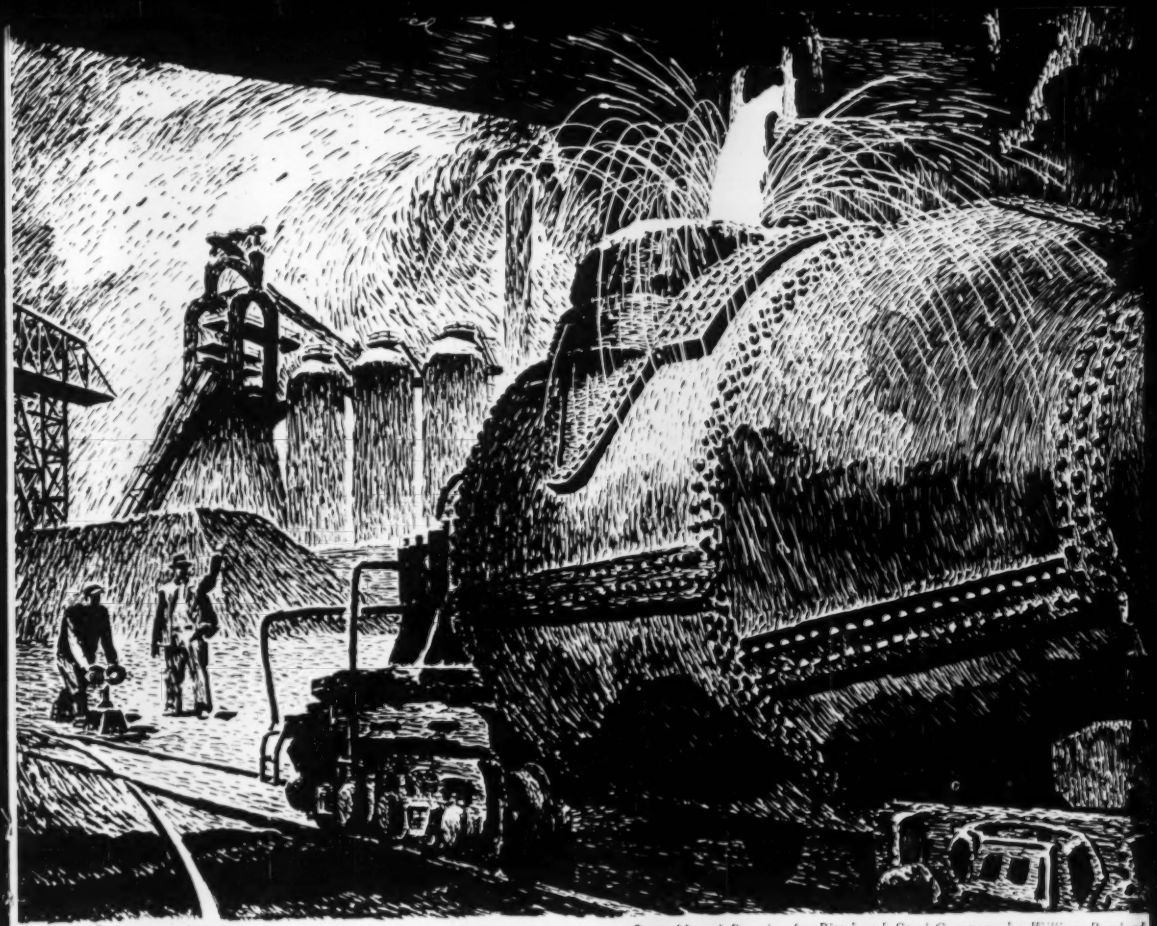
Type 430 does not lend itself readily to stretch forming. The metal necks down locally when stretched instead of work-hardening and distributing its plastic deformation. This characteristic, a disadvantage in stretching and drawing, makes type 430 easier to fabricate by spinning.

Welding Easy—Welding chromium stainless steels is not difficult. However, welding temperatures cause grain growth and brittleness. More ductile welds can be made with inert gas shielded arc welding and with the various types of resistance welding because less general heating is involved. Annealing after welding helps reduce brittleness.

It is better to make welds that do not require filler metal. Nevertheless, rods of type 430 stainless can be used on welds that will be annealed; otherwise type 304, 308, 309 or 310 rods offer advantages in ductility at the weld bead. The manufacturers of welding equipment can offer very sound and helpful advice on problems that arise in welding chromium stainless.

Soldering type 430 stainless steel for a seal on a mechanical joint is practicable if an etched or wettable surface is provided.

Polishing type 430 stainless is much the same, mechanically, as polishing type 302. However, there may be more of it to do when the steel has been severely formed. On the other hand, moldings made of moderately formed strip are buffed to high luster with little work. The fact that an open, rougher surface results from extensive forming of type 430 means that sometimes more metal must be removed before all imperfections are



Tapping A Blast Furnace

Scratchboard Drawing for Pittsburgh Steel Company by William Pendred

Progress in Steel

Later this year a greatly swollen stream of steel products will flow from Pittsburgh Steel Company's works and into the channels of American industry. This quickening flood will be the result of an expansion program that represents a fifty percent increase in capacity for Pittsburgh Steel—an extra half-million tons of vital metal per year.

A few months ago, as a part of its planned Program of Progress, management at Pittsburgh Steel decided to expand its production of steel wire and seamless steel tubular items—also to add a new line of steel sheet and strip.

In order to do this, provision had to be made to produce more iron. This is being done by increasing blast furnace efficiency. Soon increasing streams of iron, stemming from these roaring furnaces, will help fill the newly expanded open-hearth furnaces. There it will be changed, by further processing, into steel. Then it will go on through rolling and finishing mills, which are also being expanded, to become quality wire and tubular products—strip and sheet—to serve all industry and the armed forces.

This Program of Progress at Pittsburgh Steel is a part of the industry-wide expansion plan which will add millions of tons of steel capacity to the might of the nation. It exemplifies the determination of the industry to be prepared and ready to face the greatest demand for steel for defense and peacetime needs the world has ever known.

Pittsburgh Steel Company

Pittsburgh, Pennsylvania

Need Hydrogen?

GET DU PONT "NATIONAL"®

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Do you know these other Du Pont chemicals for metal treating?

HYDROXYACETIC ACID 70%—For bright dipping of copper, electro-polishing of stainless steel and electroless plating of nickel.

METHANOL—Source of hydrogen and carbon monoxide for an efficient reducing atmosphere in many metallurgical operations, and for cleaning of metal parts during fabrication.

Product information on these and other chemicals is available. Please write on your letterhead to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Wilmington 98, Delaware.

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BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

POLYCHEMICALS DEPARTMENT

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818 Olive Street, St. Louis 1, Missouri

cleaned up. This usually indicates one additional operation, with coarser abrasives, before the customary polishing routine is started. There may be more tendency on the part of type 430 to pick up metal and load wheels or belts under some conditions.

Chemistry May Be Modified Work now going on in producers' laboratories indicates possibilities of modifying the chemistry of type 430 for better weldability and formability. These advances should prove timely.

In the immediate future type 430 can be expected to fill very creditably a good part of the gap left by withdrawal of the nickel-bearing grades. In the course of using type 430 stainless, manufacturers are almost sure to discover some applications for which this material is ideal in all respects both for utility and ease of processing. Such applications, of course, might well have been specified as type 430 in the first place.

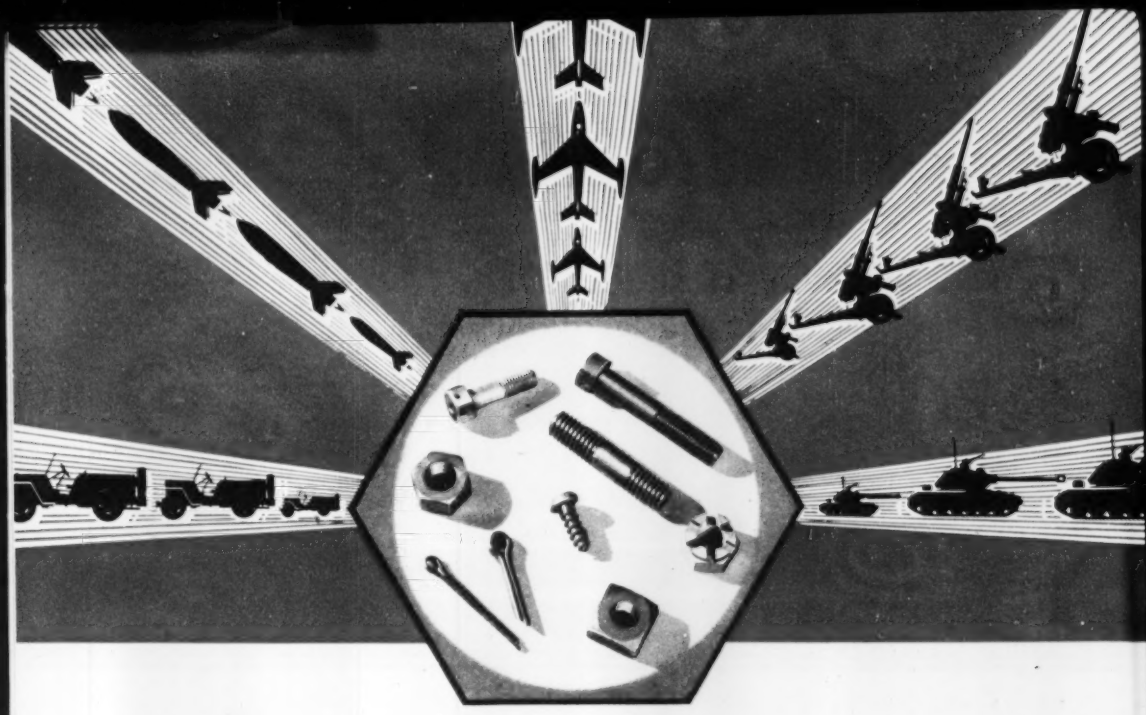
According to several informal surveys, such instances will not be numerous. It appears that well over 90 per cent of the manufacturers who are now using type 430 in place of the 18-8 stainless grades plan a return to the chromium-nickel alloys as soon as they are available. How the balance is established will actually depend, to a considerable extent, on the duration of the emergency, overall costs, and the extent to which new manufacturing techniques are adopted.

Military Packaging Instruction

A Joint Military Packaging Course is being conducted by the Army at Rossford Ordnance Depot. Course is designed to train Army, Navy, Air Force and Marine Corps personnel and certain personnel from industry at the foreman or supervisory level in the basic methods of military preservation, packaging, packing and marking.

The course is a continuing one with classes of two weeks duration starting each week. Spaces are reserved in each class for firms holding military contracts with first priority given to prime or subcontractors supplying equipment packed for overseas shipment.

Applications from firms interested in having representatives attend should be directed to the Officer-in-Charge, Joint Military Packaging Course, Rossford Ordnance Depot, Toledo, O. Firms must furnish at least one of their current military contract numbers and a brief description of the material or equipment being supplied.



Fasteners

. . . for our "First Lines" of Defense!

Granted—our Armed Forces have always been our First Lines of Defense. This is a proud distinction nobody can usurp.

But even before the men of our Army, Navy and Air Forces can go into action, the Production Lines of the country must supply the "tools" for the job.

Lamson & Sessions manufactures fasteners which play a vital part in keeping these "first lines" rolling. For practically every finished product requires bolts, nuts, screws, cotters, etc. In fact, over 2% OF THE STEEL PRODUCED IS USED TO FASTEN THE REST TOGETHER.

You who run the production "first lines of defense" are welcome to consult Lamson anytime on fastener problems.

The home of "quality controlled" fasteners

Lamson + Sessions

The **LAMSON & SESSIONS** *Co.* • General Offices: 1971 West 85th Street • Cleveland 2, Ohio

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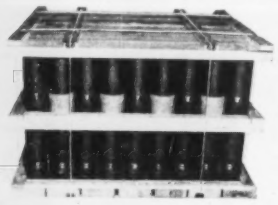
Can we help you with defense orders?

GERRARD ROUND STEEL STRAPPING

complies with packaging specifications

JAN-P-106A and JAN-P-108

● Take advantage of Gerrard's years of experience in packing and packaging when you face the problem of packing defense orders. Gerrard Round Steel Strapping complies fully with the joint Army-Navy specifications JAN-P-106A and JAN-P-108 for overseas packing.



These shells were easily and securely tied to a pallet with Gerrard Round Steel Strapping.

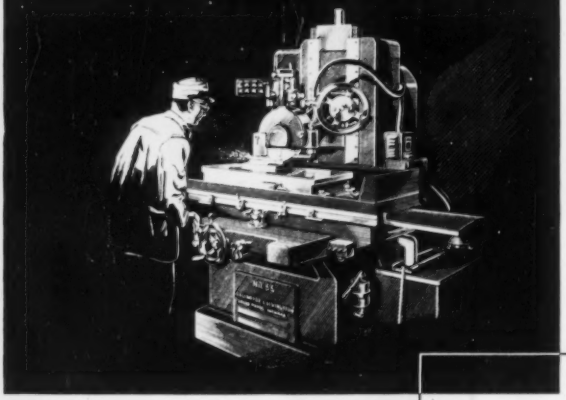
A Gerrard engineer can help you with your packaging problems. He can assist you to plan boxes and cartons that conform to specifications, and at the same time help you to make the best use of the steel strapping available for packaging. Where practicable, our engineer will demonstrate the advantages of using Gerrard Steel Strapping for bundling, palletizing, or securing packages with the Diagonal Tie.

Orders for defense requirements receive preference in delivery according to current regulations. Strapping available for non-defense orders is being equitably distributed among our customers. Phone, write or wire for further information.

Gerrard Steel Strapping Company,
4745 South Richmond St., Chicago 32, Ill.

UNITED STATES STEEL

WHEN THE DECISION IS PRECISION...



Where extreme tolerances are not required, the choice of any particular grinding machine may not be too important. But, where absolute precision is demanded, the choice is usually *Grand Rapids*.

Defense orders make it impossible to fill orders as quickly as we desire—but we know our customers can appreciate the reasons for delay. As always we'll do our best to serve you.

GALLMEYER & LIVINGSTON CO.
307 Straight Ave., Grand Rapids, Mich.

Grand Rapids Grinders
—World's finest

GALLMEYER & LIVINGSTON

Die Stock Process Improved

Masonite Corp., Chicago, is producing die stock by an improved process recently patented. In the manufacturing process, edges of the blanks are sealed with a resinous material so that moisture adjacent to the edge portions is retained in the stack of blanks during the pressing operation. As a result, the bond strength and modulus of rupture are maintained uniformly throughout the panel.

Die stock was developed by the company to meet demand for a lightweight, durable and economical panel material to be used in fabricating sheet metal—especially copper, brass and aluminum—and thermoplastic sheets. It is used by many industries today for experimental tooling, mockups and experimental models.

Product contains less than 3 per cent voids, is light in weight despite its density. Weight is less than one-half as much as aluminum and one-sixth as much as steel.

Rolling Mill Brochure Published

Design and application features for a wide range of Bliss rolling mills and accessories are described and illustrated in a 52-page brochure published by E. W. Bliss Co. Included are reports on the use of the company's equipment in ferrous and nonferrous metal plants for breakdown, finishing and handling operations on solids, shapes, sheet, strip and foil.

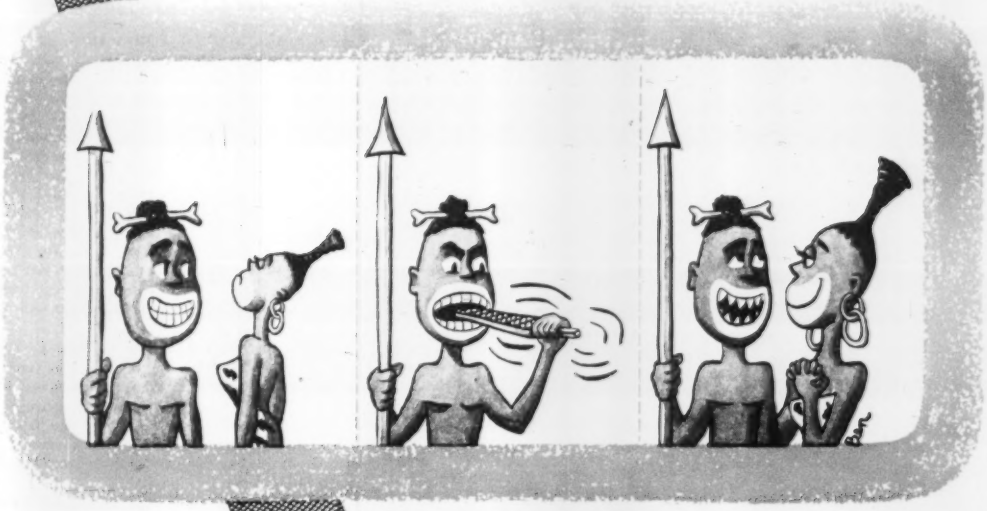
The brochure is composed of these sections: Hot rolling mills for steel and aluminum industry, hot mill downcoilers for steel plants; cold finishing mills—two-high, four-high, six-high, for steel, brass and aluminum plants; auxiliary equipment—roll breakers, roll changers, tension reels, levelers, trimmers, run out tables, shears and coil lifts; welded assemblies produced on contract at Salem; and 16 pages of reference material for rolling mill engineers. Copies of the Bliss Brochure can be secured by writing on company letterhead to E. W. Bliss Co., Salem, O.

Jet Engine Subcontract Awarded

Gerity-Michigan Corp., Adrian, Mich., has an order from the Packard Motor Car Co., Detroit, to manufacture compressor front frames, in connection with production of Packard's version of the J-47 turbojet engine.

The J-47, which Packard is to build as a prime contractor with the Air Force under a licensing agreement with General Electric Co., has been designated for the Boeing B-47

"A Nicholson File for Every Purpose" is the caption over which this cartoon appeared in one of a series of advertisements in The Saturday Evening Post.



The right teeth make a big difference

Enlarged "horizon" (cross section) of the teeth of a typical Nicholson file.

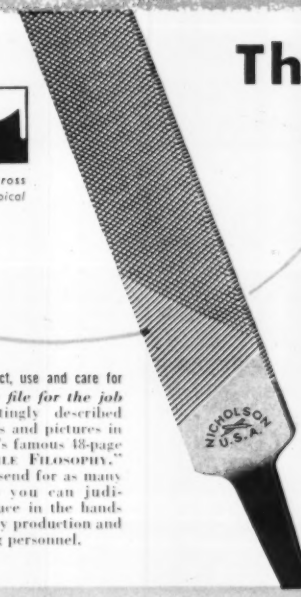
Proper design, even height, uniform sharpness and correct hardening of teeth are tremendously important in lengthening the life and increasing the efficiency of files. Such qualities take on added significance as defense preparedness calls for production speed-ups, steel conservations and maximum tool wear. They are "naturals" in Nicholson products.

Nicholson file manufacture has *always* given uppermost thought to the designing, cutting and heat-treating of the myriads of tiny teeth which constitute the vital "business ends" of one of industry's most indispensable hand tools.

Thus, it can be said that Nicholson and Black Diamond files "speak through their teeth." And what they say is, "*Twelve perfect files in every dozen*—made from top-quality file steel and 87 years' experience."

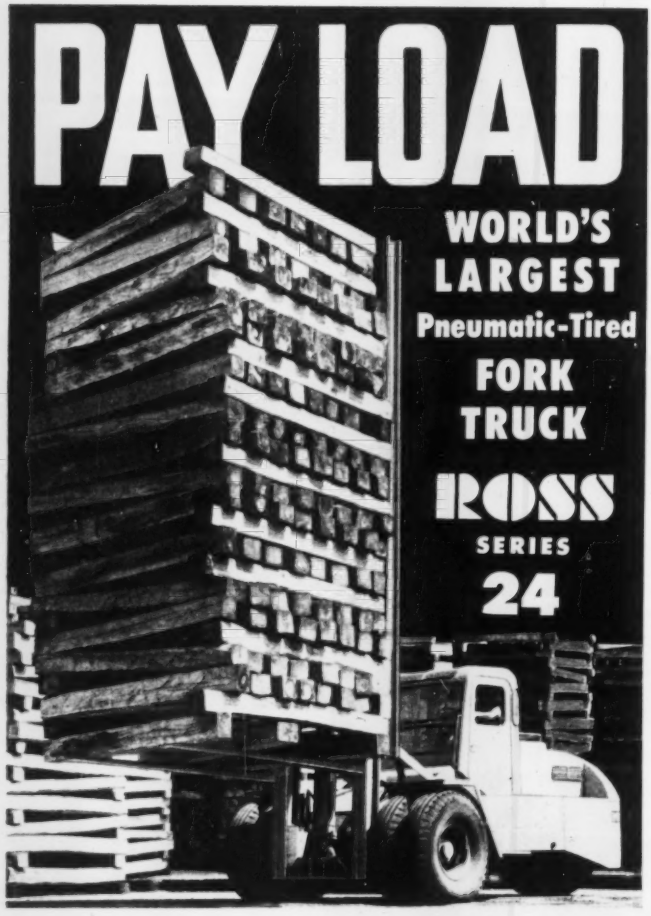
Sold through industrial distributors throughout the world.

How to select, use and care for ***The right file for the job*** is interestingly described with words and pictures in Nicholson's famous 48-page book, "FILE FILOSOPHY." FREE . . . send for as many copies as you can judiciously place in the hands of your key production and purchasing personnel.



NICHOLSON
A FILE FOR EVERY PURPOSE

NICHOLSON FILE CO. • 71 ACORN STREET • PROVIDENCE 1, RHODE ISLAND
(In Canada, Port Hope, Ont.)



HANDLES LOADS WEIGHING 26,000 LBS. - 72" WIDE

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SPEEDS HANDLING OF BILLETS, BARS, IN-PROCESS AND FINISHED MATERIALS

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HUGE 14.00-20 TIRES, PLENTY OF WEIGHT ON DRIVING WHEELS - MINIMUM YARD SURFACING REQUIRED

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TAKES TOUGHEST OPERATING CONDITIONS IN STRIDE

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You'll want full details on this giant fork truck . . . designed to further speed mass handling of heavy materials and reduce costs even more. Write today.

Rely On ROSS

THE ROSS CARRIER COMPANY

Direct Factory Branches and Distributors Throughout the World

450 Miller St., Benton Harbor, Michigan, U.S.A.

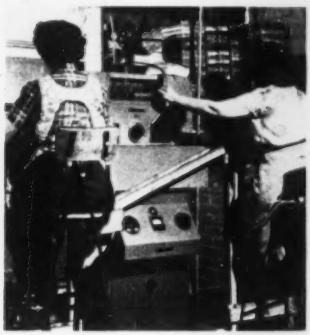
Stratojet. For security reasons, dollar volume and other details involved in the new relationship between the two companies cannot be divulged.

"Hot" Corrosion Spotlighted

A quantity of information on the corrosive effects of various hot environments has been accumulated by the development and research division, International Nickel Co. Inc., New York, according to an announcement by T. H. Wickenden, vice president in charge of the division. This has involved a continuing and expanding program designed to evaluate the corrosion resistance at high temperature of different metals and alloys for applications encountered in the aviation, petroleum, chemical processing, heat treating and other fields.

"There is still a great deal to be learned about high-temperature corrosion, not only with respect to some of the underlying principles governing surface reactions, but also from the practical aspect as to means of eliminating or minimizing corrosion

Ultrasonic Unit Speeds Cleaning



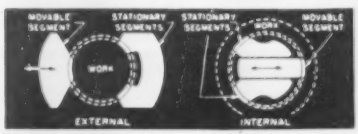
CLEANING tiny openings in electric shaver heads is being handled by an ultrasonic cleaning device at Schick Inc., Stamford, Conn., with a 59 per cent reduction in cleaning costs. Special compounds used in grinding the heads as well as metal particles become lodged in small corners and capillary spaces making cleaning by ordinary methods difficult. The General Electric ultrasonic generator, a major component of the new device, converts electrical energy into sound energy at a frequency within the radio broadcast band. This energy is transmitted through a cleaning solvent. The shaving heads mounted on a chain pass through the activated field removing grease, metal shavings and lapping compound

*What's in Vermont this month?**

AN ENTIRELY NEW PRINCIPLE SPEEDS THREAD INSPECTION

A new principle of thread inspection has been developed that is *visual*, and so fast as to obsolete most conventional production gaging methods. It is more accurate and, even with inexperienced help, is 4 to 5 times faster than the ring and plug gage system. It eliminates threading and unthreading the part with the gage threads. It shows instantly the size, presence of burrs and out-of-roundness, and the accumulated inaccuracies of pitch, lead, diameter and thread form. It shows variation between production threads and a known master.

This new principle employs three ground thread segments — two stationary and one movable by a control lever. Gages, using this principle, are available to inspect internal or external threads



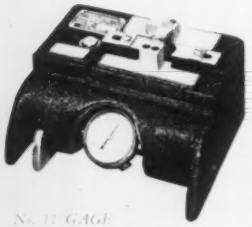
from $\frac{3}{16}$" to 4". Attachments make possible instant reading of concentricity of an O.D. with the P.D. or squareness-of-face with P.D.

* Remember . . . It won't cost to inquire!

Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

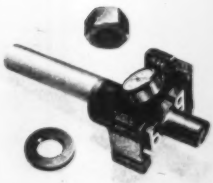
FOR CHECKING THREAD ASSEMBLE-ABILITY

The Bryant Line of Thread Gages



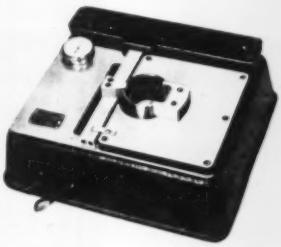
No. 11 GAGE
internal or external from ¼" to 1"

These Bryant Thread Gages give a visual quantitative reading of accuracy within tolerances, or accumulated inaccuracies of lead, pitch diameter and thread form, or the presence of burrs. For the first time, threads may be checked for *assemble-ability* into known classifications for fit. Bryant Gages are built in many standard and special models to handle the inspection of a wide range of threaded parts, both internal and external. Attachments may be provided for checking squareness of face to show relationship of face to pitch diameter. Segments for both external and internal gages are furnished to either GO or NOT GO thread form to "W" tolerances, thus accommodating all classes of fits. Capacities of standard bench models are ¾" to 5" internal and $\frac{7}{16}$" to 5" external; portable models are $\frac{7}{16}$" to 3" internal. Write the factory for full information.



No. P-11 PORTABLE GAGE
internal from ¼" up

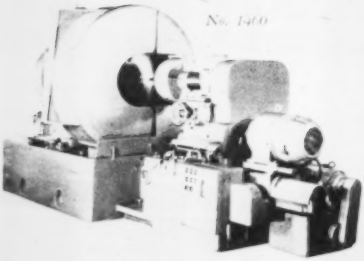
SQUARENESS-OF-FACE GAGE
for No. 11 Gage



No. 2 and No. 3 GAGE
internal and external from 1" to 5"

FOR HOLE GRINDING

No. 2209-D



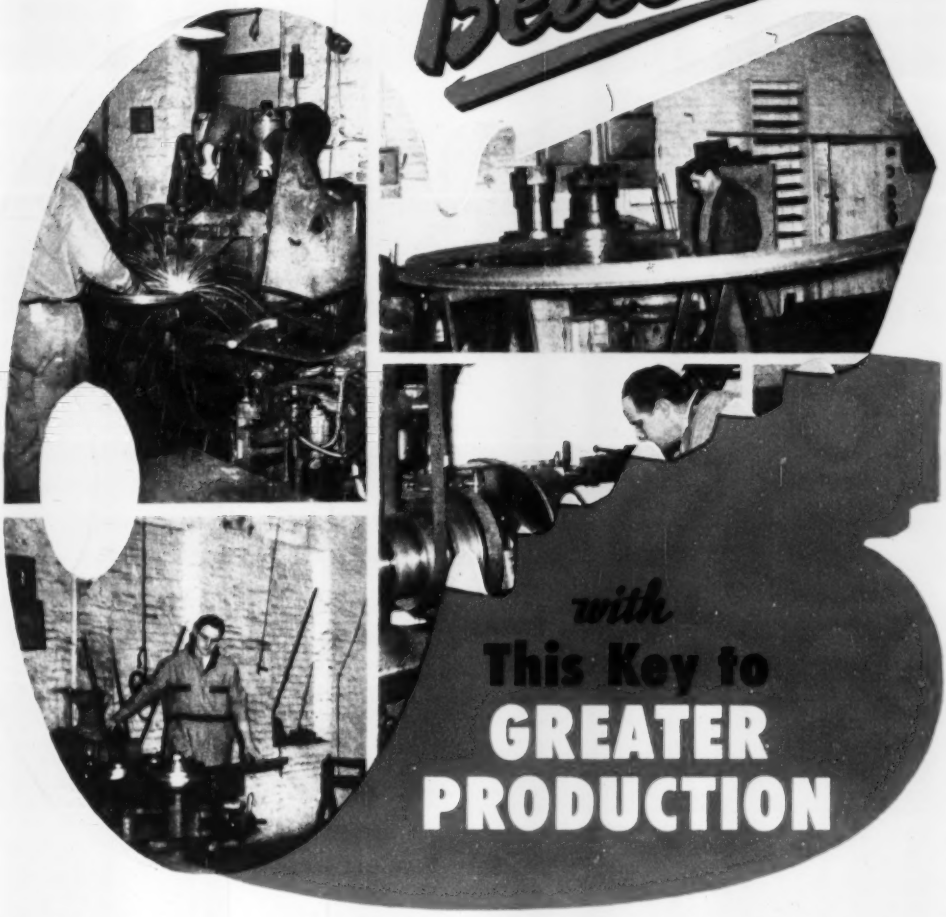
No. 140-0

The Bryant Line of Precision Hole Grinders

Since 1909 the Bryant Chucking Grinder Company has specialized in building precision grinders for finishing holes where the part can be held in a chuck. Bryant equipment has always been outstanding for the advanced engineering that has gone into the product and for the research and development which stands behind the engineering. The purpose of the Bryant machines has been to finish holes to maximum precision at a minimum of cost both on the production line and in the tool room. Bryant machines are available to finish holes from thirty thousandths of an inch to five feet in diameter.

Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

LOCK UP THE *Better* JOBS



Stands to reason you can't handle many *more* jobs but you can take on better *quality* jobs . . . jobs which return a better profit . . . jobs which demonstrate your top ability.

Well, you can go after and lock up the better jobs when you select King to supply your ring requirements. King bends and welds from bar stock, bands, flanges, angles, special shapes to your specifications. Make King your ring department. Save time, money, material, labor. A phone call, a wire, a letter will start King working as your Ring Department.

King **FIFTH WHEEL COMPANY**
2915 N. 2ND ST., PHILADELPHIA 33, PA., NE-4-2444

damage by selection of appropriate alloys," Mr. Wickenden says. "As operating temperatures in many industries continue to increase, it is inevitable that high-temperature corrosion problems should multiply on a cumulative basis.

Mr. Wickenden pointed out that a large amount of data on the creep and rupture characteristics of materials at temperatures up to and including 1800° F and some data at temperatures as high as 2100° F. have been secured in the company's laboratories at Bayonne, N. J., and Huntington, W. Va. In addition, test spools, or racks, have been installed under actual operating conditions in industry. Each of these spools contains specimens of a variety of alloys and a comparison of their performance is made at frequent periods of time.

While strength characteristics are unquestionably important, he emphasizes that to achieve long life and trouble-free service in high temperature environments, it is usually necessary to place governing importance on the corrosion behavior. This fact has been further confirmed by information on high-temperature corrosion mechanisms studied at the laboratories and by the division's engineers.

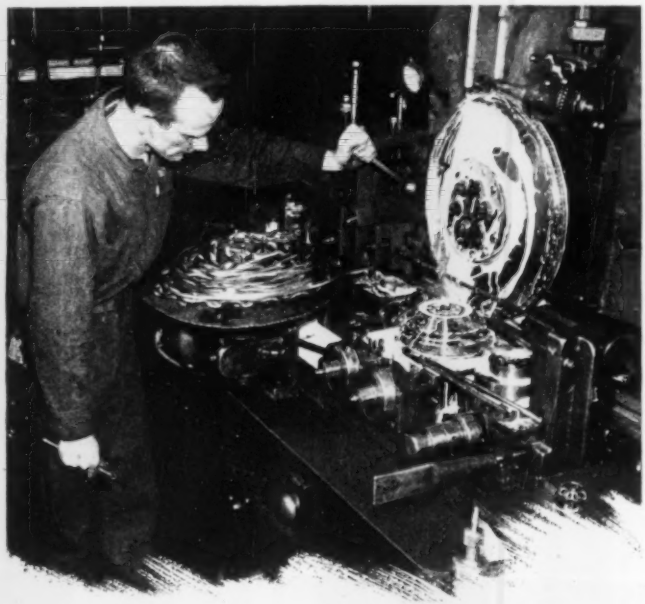
Output Climbs on Roller Drive

A special seam rolling machine, designed and built by the plant engineering department, Ryan Aeronautical Co., San Diego, Calif., is stepping up the job of smoothing weld seams by 1000 per cent. Especially designed for the work, this new machine is used to flatten the Heliarc welded seams of stainless steel exhaust sections. These sections are large tubular parts which have been welded into circular form to serve as aircraft engine exhaust components.

Formerly, these parts were welded with filler rod added and the resultant bulge of metal at the seam was ground away by hand, using a power driven grinder. This involved substantial time required to remove excess weld metal and obtain a smooth finish.

With the new seam roller, it is now possible to weld the sections by Heliarc without using any filler metal. This provides less excess metal to be removed. The welded sections are placed between two steel rollers in the seam roller and the heavy pressure of the rollers exerts a purifying action while at the same time flattening the weld seam and improving the weld quality by refining the grain structure of the metal. Only a few seconds are required to

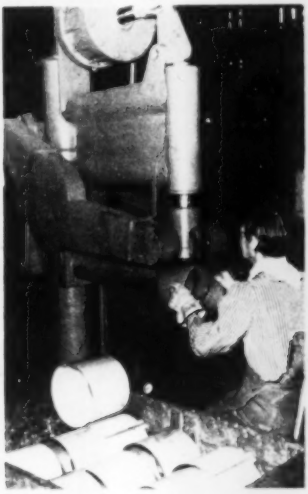
BRAINARD TUBING IN THE MAKING...



THE WELDING OPERATION involves a split electrode with current passing from one side to the other, heating the tube to welding temperature. The side pressure rolls then force the bond. Excess metal is peeled off, making a clean, neat tube. Busy as we are in times like these, this operation gets careful supervision at Brainard. We have complete control of every operation from ore to tube. That's why it will pay you to call on Brainard first when you have a job for electric welded mechanical tubing. Straight or fabricated. Sizes: ½" to 4"—.025 to 165.

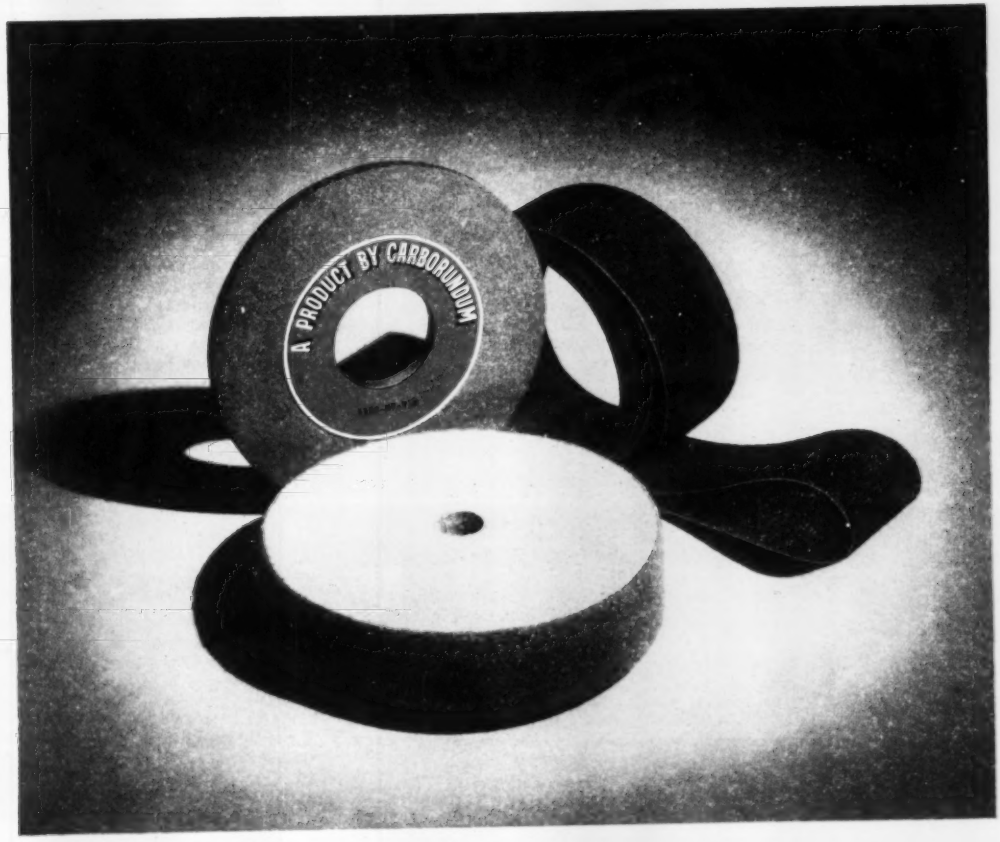
Sales offices: Atlanta, New York, Cincinnati, Pittsburgh, Buffalo, Chicago, Philadelphia, Dearborn, Cleveland, Tonawanda, N.Y., Rochester, Indianapolis, Nashua, N.H. Sales representatives: Sharonsteel Products Co., Dearborn, Mich., Grand Rapids, Mich. and Farrell, Pa. Fred J. Reynolds, Davenport, Iowa. Brass & Copper Sales Co., St. Louis, Mo. and Kansas City, Kan. Julius Schulz, Dallas, Texas.

Brainard STEEL COMPANY WARREN, OHIO



TEN TIMES AS MANY PARTS

. . . grinding no longer necessary



You can't miss...

Not when you pick a product by CARBORUNDUM. A complete line of all abrasive products is your assurance of selective product application. You match the best method with the right product from the complete standard line by CARBORUNDUM.

Thus, the recommendation of an experienced CARBORUNDUM salesman or distributor is not merely helpful...it's impartial. These men have no reason to offer anything but the best method and product for your job...they sell the only complete line of products identified by the best known name in abrasives.

This experience in all abrasive products and methods is an excellent proving ground for new products and methods. Ask your CARBORUNDUM representative about them. You can't miss.

Only CARBORUNDUM

TRADE MARK

makes ALL Abrasive Products... to give you the proper ONE

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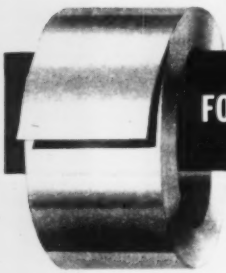
typewriters tables & time-saving



FOLLANSBEE COLD ROLLED STRIP

is custom-made steel suitable for innumerable products. It offers many time-saving advantages, too. It's a productioneer's tool—providing a continuous supply of uniform steel from coils to your automatics, regardless of forming operations involved.

Follansbee Cold Rolled Strip in coils is available in tempers and finishes to meet most specifications. Take advantage of Follansbee's custom-service. It's tailored to *your* metal-working requirements. Call the Follansbee Steel Representative near by and he'll tell you all about it.

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SEAMLESS TERNE ROLL ROOFING • POLISHED BLUE SHEETS & COILS • COLD ROLLED STRIP

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SALES OFFICES—NEW YORK, PHILADELPHIA, ROCHESTER, CLEVELAND, DETROIT, MILWAUKEE. **SALES AGENTS**—CHICAGO, INDIANAPOLIS, KANSAS CITY, NASHVILLE, LOS ANGELES, SAN FRANCISCO, SEATTLE, TORONTO AND MONTREAL, CANADA.

MILLS—FOLLANSBEE, W. VA. **FOLLANSBEE METAL WAREHOUSES**—PITTSBURGH, PA., ROCHESTER, N. Y., AND FAIRFIELD, CONN.

1475

run each section through the machine.

The seam roller is operated by a ½ hp electric motor. The operator places the part between the two rollers and depresses a foot switch. This actuates an air cylinder bringing the upper roll down against the part and the lower roll. A pressure operated switch in the air line automatically starts the motor and the upper roll causing the parts to be drawn between the rolls. Pressures of as much as 20,000 pounds can be applied to smooth the seam.

Surge Boot Key to Aerial Fueling

Air Force's new flying filling station, the Boeing KC-97, depends on a rubber device called a "surge boot" which performs an important function in successful in-flight refueling by "cushioning" against high pressures caused by the sudden shut-off of fuel in the line. Developed by engineers of B. F. Goodrich, Akron, and Boeing Airplane Co., Seattle, the surge boot weighs only 15 pounds.

Engineers explained that the unusual construction of the boot provides the cushion to absorb the high surge pressure of fuel in the line when the flow is suddenly shut off at the nozzle. Development of the surge boot to overcome the sudden hydraulic ram effect caused by refueling interruption defied the rubber and aviation company engineers for some time because service requirements for the fueling device were difficult to meet.

Induction Heating Film Out

A few of the thousands of uses to which induction heat is being put by industry today are shown in a 16 mm sound film in color released by Allis-Chalmers Mfg. Co., Milwaukee. Production scenes include heating of steel strip for baby buggy springs, annealing of automobile brake arms, brazing fittings into refrigerator compressor housings and hardening eight localized areas of a rocker arm shaft.

Samples showing the use of induction heating in industry help to emphasize the effectiveness and speed of the method and demonstrate its versatility possible through the use of different work fixtures. A brief visual explanation of how induction heating operates is included in the 20-minute film. Prints of the film are available for group showing upon request from the company's advertising and industrial press department, General Machinery Division.

the **RIGHT** horsepower
100 horsepower and smaller sizes

Every time on every application the power drive that is the best is the one that gives you the RIGHT horsepower, the RIGHT shaft speed and RIGHT where you need it . . . all combined into one compact power package.

Don't put up with makeshift assemblies when it's so easy to get a unit that's just right for each job.

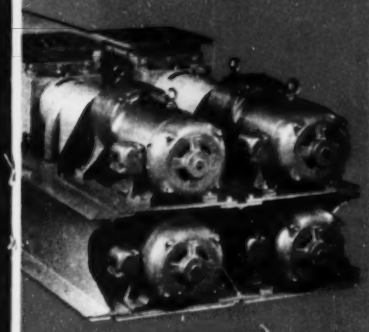
Master Motors, available in thousands and thousands of types and ratings (up to 150 HP), give you an enormous selection of units designed so that they easily combine to give you a power drive that will add greatly to the compactness, safety and economy of each job. Open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single

it works out the same every time

speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

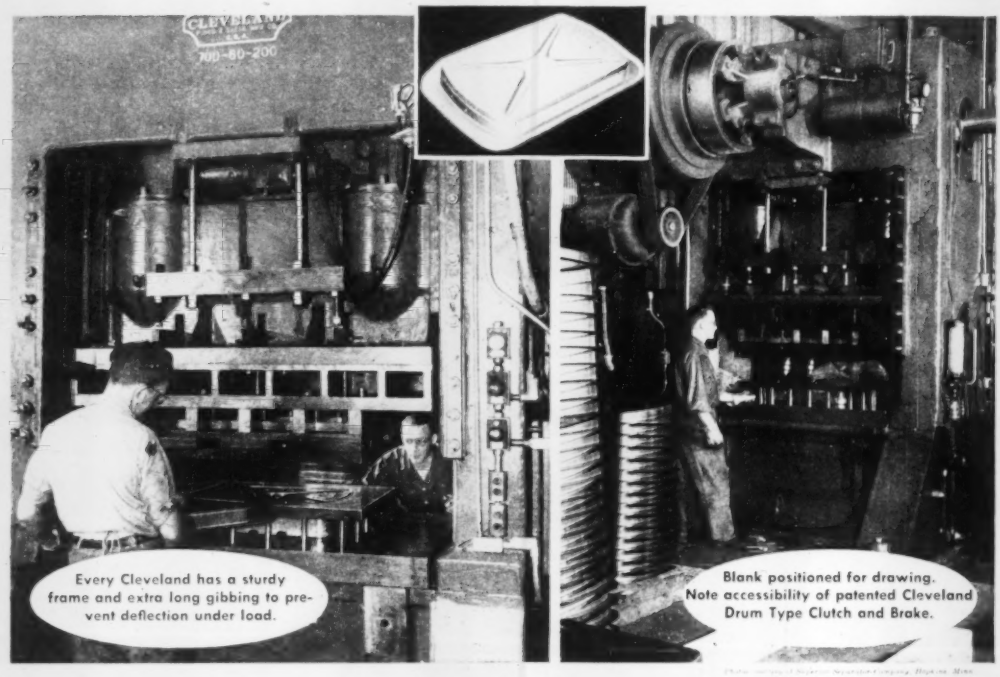
THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO



the **RIGHT** shaft speed
Gear reduction ratios up to 432 to 1

and **RIGHT** where you want it

production costs slashed 57% by new CLEVELAND PRESS


700-80-200
Every Cleveland has a sturdy frame and extra long gibbing to prevent deflection under load.
Blank positioned for drawing. Note accessibility of patented Cleveland Drum Type Clutch and Brake.

FARMHAND oil tanks, originally designed for wrap-around hand-welded production, are now drawn on a Cleveland Press and seam welded. This has resulted in spectacular savings of 57%.

Here's what Alan R. Moe, Factory Manager of Superior Separator Company, says: "Because of the extreme stability of our Cleveland Press, we found we could exceed the recommended drawing rate of 55 feet per minute on this job. We operate our Cleveland at a fast 75 feet per minute *without any tearing*. Furthermore, the press has given us no trouble since it was delivered 18 months ago. Quality of work turned out is unsurpassed."

By engineering *your* product for production on a modern high-speed Cleveland, or by replacing outmoded presses, chances are you can drastically cut production costs too. Furthermore, the extremely rigid frame construction of a Cleveland assures minimum maintenance and longer die-life. The Cleveland Drum Type Friction Clutch and Brake gives increased efficiency and economy of operation. So call a Cleveland engineer today. Let him show you why a Cleveland will give you top press performance for lower production costs.

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CALENDAR
OF MEETINGS

† *Denotes first listing in this column.*

September 3-7, American Chemical Society: Annual meeting, Hotel Statler, Washington. Society address: 1155 16th St. NW, Washington 6. Executive secretary: Alden H. Emery.

September 4-6, Liquefied Petroleum Gas Association: Pacific Coast convention, Fairmont Hotel, San Francisco. Association address: 11 S. La Salle St., Chicago 3. Executive vice president: Howard D. White.

September 5-7, American Hot Dip Galvanizers Association Inc.: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 2311 First National Bank Bldg., Pittsburgh. Secretary: Stuart J. Swensson.

September 6-7, Rail Steel Bar Association: Semi-annual meeting, The Broadmoor, Colorado Springs, Colo. Association address: 38 S. Dearborn St., Chicago. Secretary: W. H. Jacobs.

September 8-9, New York; September 14-15, Washington—International Union of Pure and Applied Chemistry: Bi-annual meeting. Chairman, U. S. division: Prof. W. Albert Noyes Jr., University of Rochester.

September 10-13, International Congress of Pure and Applied Chemistry: New York. Chairman, U. S. division: Dr. Arthur B. Lamb, Harvard University.

September 10-14, International Foundry Congress: Brussels. Address: General Secretary, Foundry Congress, c/o Fabrimetal, 17 Drapiers St., Brussels.

September 10-14, Instrument Society of America: National instrument conference and exhibit. Sam Houston Coliseum, Houston. Society address, 921 Ridge St., Pittsburgh 12. Secretary: Richard Rimbach.

September 10-15, Annual Industrial Engineering Conference: Mechanical Department, Industrial Engineering Division, Michigan State College, E. Lansing, Mich.

September 11-13, Society of Automotive Engineers: Tractor meeting, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York. Secretary: John A. C. Warner.

September 14-16, American Society of Sanitary Engineering: National convention, Hotel Statler, Detroit. Society address: 1308 Freemont St., McKeesport, Pa. Secretary: T. M. Dugan.

September 17-19, Allied Railway Supply Association: Fall meeting and exhibit, Hotel Sherman, Chicago. Association address: Box 5522, Chicago 80. Secretary: Charles F. Weil.

September 21-22, National Association of Waste Material Dealers Inc.: Fall meeting, Saranac Inn, Upper Saranac Lake, N. Y. Association address: 1109 Times Bldg., New York 18. Secretary: Clinton M. White.

September 24-25, Steel Founders Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland 20. Secretary: F. Kermit Donaldson.

September 25-28, American Society of Mechanical Engineers: Fall meeting, Hotel Radisson, Minneapolis. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

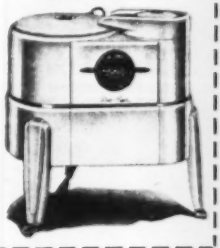
September 26-29, Marking Device Association: National convention, Edgewater Beach Hotel, Chicago. Association address: 134 N. La Salle St., Chicago. General manager: E. F. Way.

September 27-30, Multiple V-Belt Drive & Mechanical Power Transmission Association: Annual meeting, The Broadmoor, Colorado Springs, Colo. Association address: 7 W. Madison St., Chicago 2. Executive Secretary: Harry P. Dolan.

(Continued on p. 102)

THIS LUBRICANT SAVES GEARS AND TRANSMISSIONS

—says AUTOMATIC WASHER COMPANY Newton, Iowa



They write us.

"We have used LUBRIPLATE in our washing machine transmissions since 1933. Our laboratory tests as well as field experience indicate that through the use of LUBRIPLATE we reduced the wear on the gears and prolonged the life of the transmission.

"The transmission is the heart of any washing machine, and the long life and trouble-free performance obtained by the use of LUBRIPLATE in the Automatic Washer transmission has been an important factor in the success of our product."

AUTOMATIC WASHER COMPANY
F. Breckenridge
Executive Vice-President

The use of LUBRIPLATE in a washing machine is a severe test. Bearings and parts are subjected to moisture, hot water, caustics and sometimes acids. A lubricant to give efficient lubrication under these conditions must be an unusual product.

LUBRIPLATE Lubricants reduce friction and wear, prevent rust and corrosion, save power. Because LUBRIPLATE Lubricants last longer, they are more economical to use.

Let us send you CASE HISTORIES of the use of LUBRIPLATE Lubricants in your industry. There is a LUBRIPLATE product best for every lubrication need. They range from the lightest fluids to the heaviest greases. They are different from any other lubricants you have ever used. Write today for further information.

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Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio

DEALERS EVERYWHERE . . . CONSULT YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE THE MODERN LUBRICANT

(Continued from p. 101)

September 24-25, American Coke & Coal Chemicals Association: Annual fall meeting. Skytop Lodge, Skytop, Pa. Institute address: 711 14th St. NW, Washington. Executive secretary: Samuel Weiss.

September 24-26, National Truck Body Mfrs. & Distributors Association: Annual convention and suppliers exhibit. Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: 346 Connecticut Ave. NW, Washington. Secretary-manager: Shipley D. Burton.

OCTOBER

October 1-2, American Machine Tool Distributors Association: Annual meeting. Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: 1900 Arch St., Philadelphia. Executive secretary: Thomas A. Fernley Jr.

†**October 1-4, Association of Iron & Steel Engineers:** Fall meeting. Sherman Hotel, Chicago. Association address: 1010 Empire Bldg., Pittsburgh. Managing director: T. V. Ess.

†**October 2-4, Society of Industrial Packaging & Materials Handling Engineers:** Exposition and "short course." Hotel Cleveland, Cleveland. Association address: 20 W. Jackson Blvd., Chicago. Secretary: H. E. Brill.

†**October 3-6, Pressed Metal Institute:** Fall meeting. Drake Hotel, Chicago. Institute address: 13210 Shaker Square, Cleveland 20. Managing director: Orrin R. Wernz.

†**October 6-12, National Hardware Show:** Grand Central Palace, Atlantic City, N. J. Managing director: Frank Yeager.

†**October 8-13, Concrete Reinforcing Steel Institute:** Fall meeting. Grove Park Inn, Asheville, N. C. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Delzell.

†**October 10-12, Porcelain Enamel Institute, Inc.:** Shop practices forum. Deshler-Wallick Hotel, Columbus, O. Institute address: 1010 Vermont Ave. NW, Washington. Secretary: Edward Mackasey.

†**October 9-12, The Electrochemical Society, Inc.:** Centennial — Fall convention. Hotel Statler, Detroit. Society address: 235 W. 102nd St., New York 25. Secretary: Henry B. Linford.

†**October 11, American Iron & Steel Institute:** Regional technical meeting. Hotel Warwick, Philadelphia. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

†**October 12-14, Metal Treating Institute:** Annual meeting. Detroit. Institute address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Hetrington.

†**October 13-17, Packaging Machinery Manufacturers Institute:** Fall meeting. Mid-Pines Club, Southern Pines, N. C. Institute address: 342 Madison Ave., New York 17. Secretary: Helen L. Stratton.

†**October 14-18, American Hardware Manufacturers Association:** Fall meeting. Marlborough-Blenheim Hotel, Atlantic City, N. J. Association address: 342 Madison Ave., New York 17. Secretary: Arthur L. Faubel.

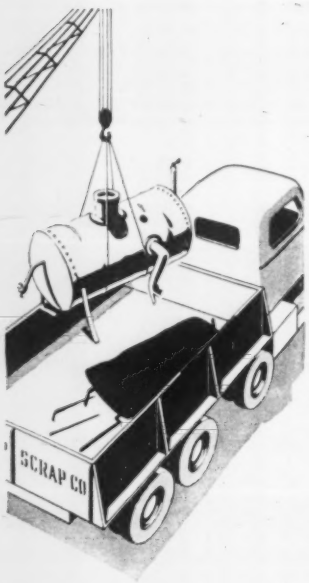
†**October 13-14, American Welding Society:** Annual meeting. Book-Cadillac Hotel, Detroit. Society address: 33 W. 39th St., New York 18. Secretary: J. G. Magrath.

†**October 13-14, American Society for Metals:** Annual seminar. Hotel Statler, Detroit. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

†**October 15-17, American Gas Association:** Annual meeting. Kiel Auditorium, St. Louis. Association address: 420 Lexington Ave., New York 18. Secretary: Kurwin R. Boyes.

†**October 15-19, American Society for Metals:** National Metal Congress & Exposition. Statler Hotel, Detroit and Michigan State Fairgrounds. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

†**October 15-19, The World Metallurgical Congress:** Hotel Statler, Detroit. Sponsored by American Society for Metals. Manager: W. H. Eisenman, director; Dr. Zay Jeffries.



QUICK WAY TO MAKE ASSETS OUT OF "CLUNKERS"

Scrap your obsolete and inefficient tools, dies and machinery . . . make worn-out equipment pay part of the cost of new machines . . . scrap prices are high today.

Your old, idle equipment will help ease the steel shortage too . . . every ton of scrap machinery helps make about 2 tons of new, vital steel.

Start today to turn your idle scrap into money . . . and steel . . . a memo to your production foremen will uncover truckloads of idle machine scrap and production scrap . . . a phone call to your scrap-metal dealer will start this much-needed metal on its way to the mills to make more steel . . . help ease the steel shortage.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
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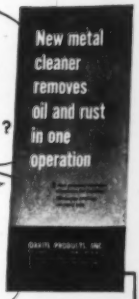
HAVE YOU HEARD ABOUT THIS NEW METAL CLEANER?

IT CAN SAVE MONEY FOR YOU



Oakite Compound No. 33

REMOVES OIL
at the same time that it
REMOVES RUST . . .
And at the same time it prepares the metal for painting

Oakite Compound No. 33 is a great soak cleaner for steel, cast iron, aluminum sheet and castings. It removes oil, rust, heat scale, other oxides, carbon smut, soldering and welding residues, identification inks and other soils. *It frequently eliminates pickling operations on moderately rusty steel.*

Oakite Compound No. 33 is great for hand-swabbing on metal surfaces too large to be soaked in tanks. It can save money for you in many ways.

FREE For a copy of Folder F7993 *"New metal cleaner removes oil and rust in one operation"*, write to Oakite Products, Inc., 34E Thames St., New York 6, N. Y.

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If you use alloy steels, you know the headache we mean . . . shortages and restrictions on the analyses you've been accustomed to using. Because certain alloying elements are required for vital defense jobs, you may be unable to get the particular alloy you're tooled up to use.

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Use the 3-dimensional Metallurgical Service that only Republic can give to shift your designs, your products, and your production lines to currently-available alloy steels. The Republic Field Metallurgist, backed up by the Republic Mill and Laboratory Metallurgists, and working as an advisor to your own staff can help make that shift easier for you.

Realignment of alloy steel analyses and their elements is a job to be handled by skilled metallurgists and manufacturing men. It will pay you to let Republic—world's largest producer of alloy and stainless steels—pick the best alloy available.

Which alloy? Ask the Republic Metallurgist.

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...combines the extensive experience and coordinated abilities of Republic's *Field, Mill* and *Laboratory* Metallurgists with the knowledge and skills of your own engineers. It has helped guide users of Alloy Steels in countless industries to the correct steel and its most efficient usage. IT CAN DO THE SAME FOR YOU.

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. . . THE BETTER THE OPPORTUNITY FOR

abrasive cutting

Here's one way to open the door to savings . . . at least it's the *right method* . . . abrasive cutting!

And the *right* abrasive wheels are Allison. Whether you're cutting steel, glass, non-ferrous metals or ceramics . . . tube, rod, bar stock or shapes . . . Allison Wheels cut at high speeds, accurately to a few thousandths, with little or no need for after-finishing.

Let one of our qualified specialists — an Allison Abrasive Cutting Expert — recommend the right equipment and right wheel to help you cut costs where you're cutting!

We like tough jobs

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Allison
ABRASIVE CUTTING WHEELS

Plate for Can Stock Improved

USE of Bonedrite K for treatment of black steel plate to replace tin in bottle and package closures, on many types of food cans and containers for packing paints and varnish, blood plasma and antifreeze, saved an estimated 5600 long tons of tin during the years 1942-45. Parker Rust Proof Co., Detroit, figures that 40,000 tons of black plate was thus treated by its chemical process.

Since 1945, equipment for treating black plate with Bonderite has been improved. Speeds of continuous treating lines have increased from about 180 fpm to 600 fpm and higher. This speedup gears the supply of treated steel stock more closely to the enormous appetite of canmaking machines for sheet metal.

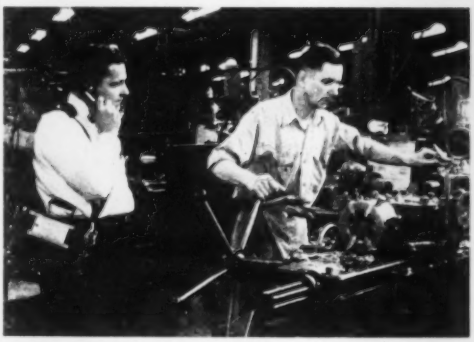
Experiments and tests have proceeded as well on improvement of the coating itself. The present version forms a thinner, tighter coating on steel, with greater flexibility and the ability to stretch and bend without cracking.

Have Tested 40 Tons—Raw material for the testing work is prepared in Parker's Detroit plant where a small Bonderite K machine handles steel sheets in the same way as do the larger production machines in steel plants. Treated sheets then are roller coated with food enamel and cut into panels for tests. An idea of the volume of tests currently being carried on is revealed by the fact that about 40 tons of black plate has gone through the treatment machine since the first of the year.

Testing method is simple. Panels are placed in racks which fit inside standard cans. The latter then are filled about a third full of cream corn or a synthetic corn mixture, sealed and placed in a pressure cooker equipped with automatic pressure and temperature controls. After thorough cooking, the cans are opened, panels are removed and a strip of adhesive tape pressed onto the enameled side. When the tape is removed it takes with it any food enamel loosened by the cooking or by the action of the food itself, giving an immediate measure of the adhesion of the enamel to the steel.

An improved type of solution known as Bonderite K10 shows greater effectiveness than the old K type.

Output Reported by Two-Way Radio

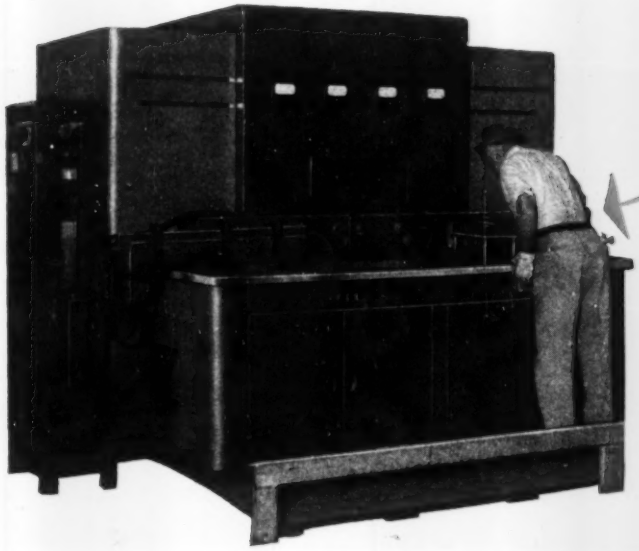


COMPLETE up-to-the-minute reports originating on the shop floor keep Weatherhead Co., Cleveland, right on top of the production status of more than 2000 products. Men with "Handie-Talkie" portable radiophones made by Motorola, Chicago, move along the production floor and report to the production control center on the status of parts being machined enabling the company to maintain a continuous inventory of orders

HOT FORMULA!

RF = LC + BP − R

Puts The Heat On Parts Production at Oliver



RF = LC + BP − R means: Radio Frequency heating equals Lower Costs plus Better Product minus Rejects . . . and here's how this formula paid off for the Oliver Corporation, Charles City, Iowa.

Oliver needed a heat treating process flexible enough to handle 15 different parts, ranging from ½ inch sleeves, lever arms and valve seats to long shafts. The hardening operation, requiring as many as 10 daily set-ups, had to supply varied parts of consistently high quality, or production would be delayed.

Oliver installed a 50 KW-450 KC RF Generator and work-handling equipment, all Westinghouse-built, which easily handled all parts, and required only about 10 minutes of an unskilled operator's time for changing set-ups. The RF induction heating process drastically cut costs 45%, and there were *no* rejects—with the net result that Oliver is able to produce a better tractor faster and cheaper.

See how this formula—or one of its many variations—has solved the heating problems of other manufacturers—problems that may parallel your own. Write for case history booklet, B-4782, Westinghouse Electric Corporation, Dept. S22, 2519 Wilkens Avenue, Baltimore 3, Md.

J-40270

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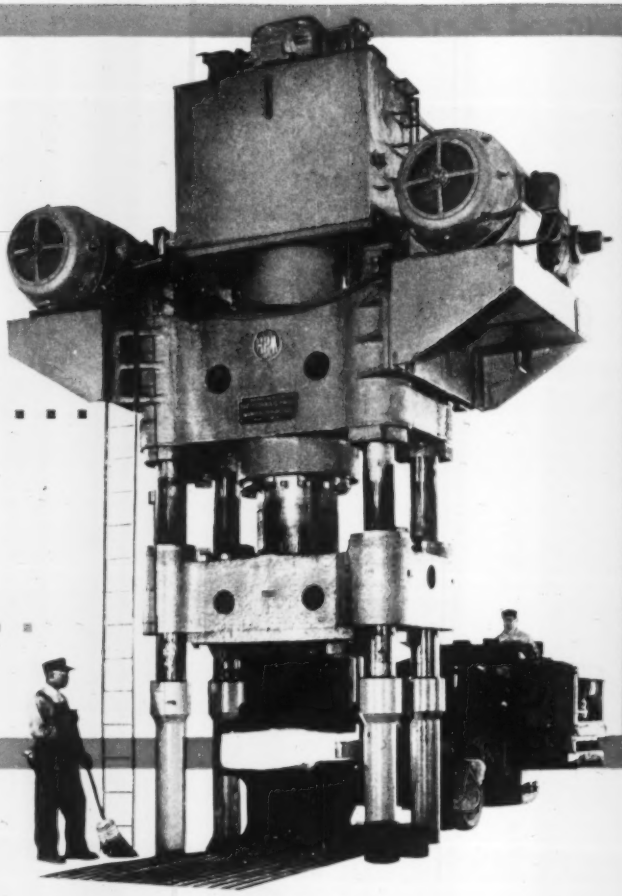
Westinghouse

INDUCTION HEATING

FOR HIGH QUALITY FORGINGS . . . USE H-P-Ms . . .



Speed, flexibility, versatility and a high degree of control make the H-P-M "All-Hydraulic" press the ideal machine for diversified forging work. These features have played an important part in the successful operations of many H-P-M forging press users—such as Cameron Iron Works billet shaping job pictured above in Houston, Texas. H-P-M presses are ideally suited for hot forming and trimming and most important currently, for piercing, drawing and nosing artillery shells.

The hundreds of H-P-M presses now serving the metal working industry have been selected because of their exclusive operational features: FASTRAVERSE "closed circuit" hydraulic operating system . . . quick, easy adjustment and control of press speeds, strokes and pressures . . . features that mean long die life and production with virtually no rejects. Find out what H-P-Ms can do on your production problems by calling in an H-P-M engineer today.

FASTRAVERSE HYDRAULIC PRESSES

Write today for your free copy of Bulletin 5005 describing H-P-M FASTRAVERSE metal working presses.

HPM

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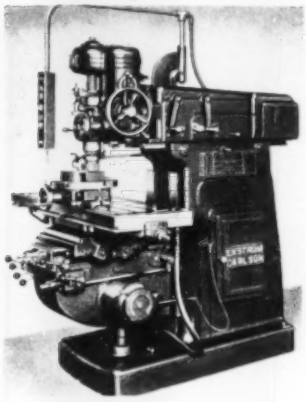
New Products and Equipment

Universal Milling Machine

Improved No. 5V Vertimil is being manufactured by Ekstrom, Carlson & Co., Rockford, Ill. Machine consists essentially of a base and column casting, a horizontally adjustable ram which is mounted on the column and arranged to support a swivel sliding spindle head and spindle drive, and a tilting work table mounted on a saddle and knee assembly arranged to provide longitudinal, cross and vertical movement



of the table. Power drive is supplied to all table movement.

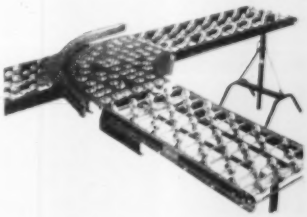
All operating controls are placed in the front of the machine to provide ready accessibility for the operator. Spindle head and table can both be tilted and the table can be moved across or longitudinally. These adjustments permit the machine to mill flat, vertical, horizontal or angle surfaces. Maximum vertical throat clearance is 19½ inches and spindle to column distance ranges from a minimum of 8 inches to a maximum of 30 inches. A 2-speed 3 hp motor provides spindle drive and a 2 hp motor is used for table feed.

Check No. 1 on Reply Card for more Details

Material Readily Diverted

Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich., has developed a flow diverter for connecting at any point on a permanent line of one of its gravity conveyors to move cartons in and out of storage bays without manual handling. Diverter kit is made up of a connecting yoke fastened to a 3-foot section of aluminum Rapid-Wheel and a slotted aluminum plate that has conveyor wheels projecting slightly above the surface. An adjustable curved aluminum guard rail is included in the kit.

To set up a spur line the connecting yoke bracket is hooked over the side frame of the permanent conveyor at the desired switching point and a support stand is placed under the opposite end of the 3-foot alu-

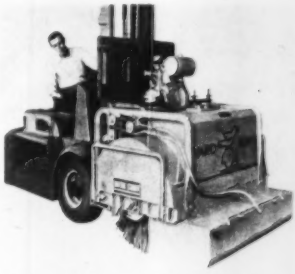


minum wheel section. Diverter plate is then placed on the permanent convoyer line at the intersecting point to transfer goods from the main line to the spur line or vice versa. Attachment can be used with 18-inch wide gravity conveyors made by the company that have either 16 or 18 wheels to the foot.

Check No. 2 on Reply Card for more Details

Power Sweeper Attachment

Introduced by Little Giant Products Inc., 1530 N. Adams St., Peoria, Ill., is a powered sweeper attachment known as the Yard Bird. It fits any fork lift truck of 1500 pounds



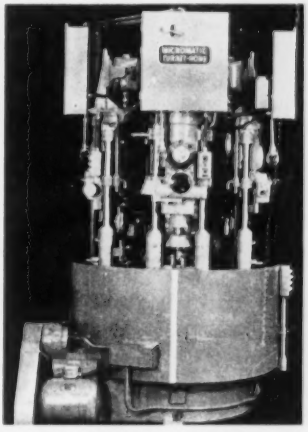
capacity and up. Attachment will clean as much as 80,000 square feet per hour with the truck traveling at the rate of 5 mph.

Unit has its own self-contained spray system for dust control. A 6.8-hp gasoline engine turns at 2400 rpm but an integral clutch reduction unit and sprockets step down brush revolutions to 164 rpm. Connected by means of four eye-bolts and clamping bars on each side just above the pipe frame, attaching parts are clamped on with wing nuts and no tools are required.

Check No. 3 on Reply Card for more Details

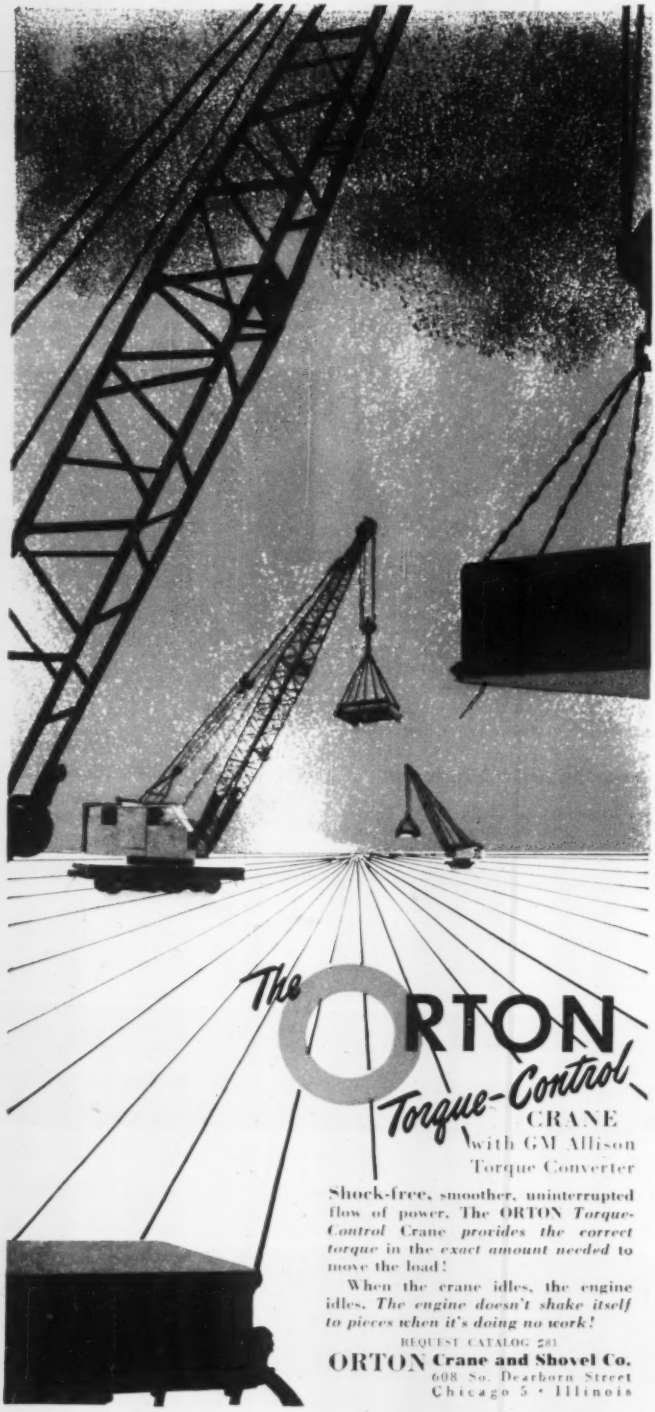
Short Length Bore Hone

Basic honing units developed by Micromatic Hone Corp., Detroit, Mich., hold precise tolerances in short-length bores up to 4 inches in diameter and less than 2½ inches



long. Unit is available in single spindle machines, or for higher production four or six units are mounted on a rotating base in models called Turret-Hones. The multiple spindle units rotate continually at 2 rpm and operator stands in one location to load and unload work as spindles pass his station. In single unit machines no hydraulic pumps are used. The fixture saddle is raised by an air cylinder and the Microdial is powered by an air operated intensifying converter.

As the fixture leaves the loading position in the multiple spindle units, a hydraulic cylinder lifts it into the honing position. The last increment of travel of the saddle operates a limit switch that starts the spindle rotating and reciprocating. At the same time the Microdial expands the tool at a controlled, positive rate. If the part is to be clamped, the tool expands to rough bore size and locates the part and clamps it just before the unit is put into operation. When bore is honed to the desired size the control stops the expansion of tool, cycles a runout period, collapses the tool, stops the spindle and drops away the fixture. When

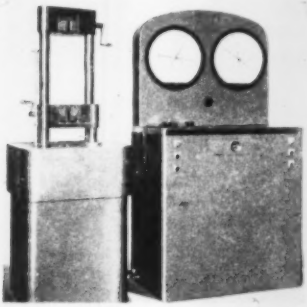

The ORTON
Torque-Control
CRANE
with GM Allison
Torque Converter
Shock-free, smoother, uninterrupted flow of power. The ORTON Torque-Control Crane provides the correct torque in the exact amount needed to move the load!
When the crane idles, the engine idles. The engine doesn't shake itself to pieces when it's doing no work!
REQUEST CATALOG 581
ORTON Crane and Shovel Co.
608 So. Dearborn Street
Chicago 5 • Illinois

unit enters the loading position, operator unloads the fixture, slips another part in and the cycle is repeated.

Check No. 4 on Reply Card for more Details

Testing Machine Improved

An improved universal testing machine of 12,000-pound capacity is announced by Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. Hydraulic loading unit in the model 12-H is separate from the indicating and control unit, which isolates recoil from breaking test specimens and



permits adjusting maximum or lazy hands with minimum drag. A rigid two-column design with $9\frac{1}{2}$ inches of clear lateral space between columns gives high accessibility in handling specimens and simplifies observations during testing.

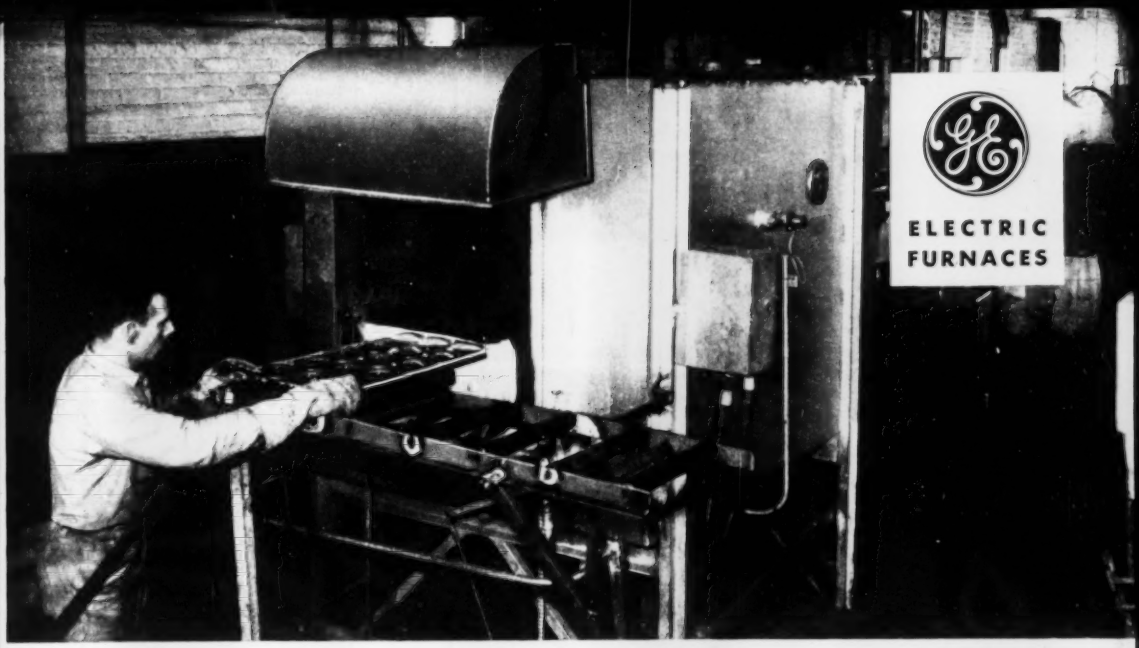
Load is applied upward by an integrated piston and elevating cage consisting of the table, two uprights and upper gripping head, all of which have an 8-inch stroke. Loading speed can be varied infinitely between zero and 10 inches per minute. Vertical distance between gripping heads may be set anywhere from 1 to 21 inches, the latter including the stroke. Table is arranged for transverse testing and is drilled to secure standard transverse tools at spans of 10, 12, 16, 18, 22 and 24 inches.

Check No. 5 on Reply Card for more Details

Lift Truck Maneuvering

Complete fork truck operation in six-foot aisles is made possible by a Sideloader attachment for industrial trucks developed by the Automatic Transportation Co., 149 W. 87th St., Chicago, Ill. Truck parked longitudinally in an aisle can stack to either side without having to turn at right angles to the aisle. Instead of the truck making the 90-degree turn, the forks do it while the truck remains stationary.

A rotary action turns the forks to either right or left and a scissors type



66% MATERIAL SAVING!

How Electric Furnace Brazing Cuts Costs $10 an Hour — Saves Steel at Technical Metal Processing Inc.

Like Technical Metal Processing Inc., Cleveland, Ohio, you probably can save material, increase output per worker, and obtain maximum production for your equipment dollar by brazing metal parts in G-E electric furnaces.

This company, for example, made a 66⅔ saving in material for one of its customers by brazing pulley hubs instead of machining them.

BRAZING REDUCES WEIGHT AND MACHINING COSTS

Previously, the company machined the hubs from $2\frac{3}{4}$-inch diameter bar-stock blanks which weighed $1\frac{1}{2}$ pounds. Electric furnace brazing enabled Technical Metal Processing Inc. to reduce the weight of the blanks to ½ pound and to speed up production by using stampings and screw-machine parts.

SAVES $10 AN HOUR

The hub assemblies are now copper-brazed in a 50-kw G-E box-type furnace at the rate of 405 units an hour. A G-E atmosphere gas converter supplies protective atmosphere so that the hubs emerge bright and clean. And cost of the hubs has been reduced $2\frac{1}{2}$¢ each saving more than $10 an hour! In addition, this same equipment is used for sintering, bright annealing and scale-free hardening.

General Electric builds a complete line of electric furnaces, protective atmosphere equipment, induction and dielectric heaters, and small heaters and heating devices. Just contact the G-E Apparatus Sales Office nearest you or write to *Sect. 720-41, General Electric Co., Schenectady 5, N. Y.*

Electric Furnaces For Annealing • Brazing • Drawing • Carburizing • Enameling • Hardening • Normalizing • Sintering • Steel Mill Applications

GENERAL ELECTRIC

HEAVY FABRICATION SPEEDED

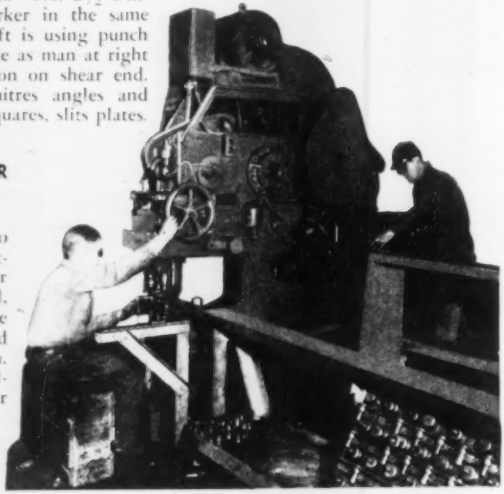
at Baldwin-Lima Hamilton Corp.

by

"Buffalo" MACHINE TOOLS

ABOVE—"Buffalo" No. 8 Bar Cutter biting off 4½ by ⅝ tee clean and fast at Eddystone Division of Baldwin-Lima-Hamilton Corp. in Philadelphia. Machine can operate at a rate of 25 strokes per minute, and can also handle angles, flats, rounds, squares, channels and beams. Massive arc-welded plate frame gives full rigidity for long life.

RIGHT—"Buffalo" No. 2½ Universal Iron Worker in the same shop. Man at left is using punch head at same time as man at right notches angle iron on shear end. Machine also mitres angles and cuts rounds or squares, slits plates.



WHAT IS YOUR PROBLEM?

If it has to do with drilling, cutting, punching or bending metal, "Buffalo" has the machine to speed up the operation. Write us for bulletins on your problem.

"Buffalo"

BUFFALO FORGE COMPANY

148 Mortimer St. Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

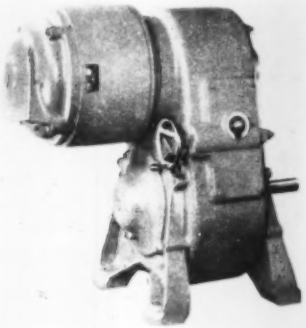
DRILLING PUNCHING CUTTING SHEARING BENDING

of expanding motion then pushes the forks out as much as 54 inches. In use, a truck parks adjacent to the spot where it is to stack its load, driver turns the forks to the desired side and then uses the scissors motion to position the pallet. Mounted on a 5000-pound capacity truck, the unit can handle pallet loads weighing up to 2500 pounds and measuring as large as 48 x 48 inches. Entire arrangement is operated by truck's hydraulic system.

Check No. 6 on Reply Card for more Details

Larger Drives Added

Larger horsepower Speed-Trol electric power drives are added by Sterling Electric Motors Inc., 5401 Anaheim - Telegraph Rd., Los Angeles 22, Calif. They are designed to meet the growing industrial demand



for variable speed drives of 20 to 25 hp ratings. The unit illustrated is the drip-proof model which prevents liquids or foreign materials from falling into the motor. Motor housing and variable speed transmission case are made of gray iron castings, providing protection against corrosion from moisture-laden or chemical atmospheres.

Positive adjustments of pulleys, infinite speed variation and accurate control of speed under varying loads are features of these motors. Drives of these ratings will also be available in splash-proof totally enclosed fan-cooled models and with built-in reduction gears for the lower speed ranges.

Check No. 7 on Reply Card for more Details

Automatic Battery Charging

An industrial battery charger, operated on the selenium rectifier principle, for units up to 55 ampere-hour capacity is available from the Philadelphia Division, Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa. Charger reduces human element to a minimum. It only needs to be plugged in, the clocks

OIL TEMPERED WIRE

by WICKWIRE

for top quality spring production

Spring manufacturers in all parts of the country have long found Wickwire oil tempered wire the answer to top quality spring production, because of its high fatigue life and unvarying uniformity in quality, temper and ductility. This pronounced preference has won for Wickwire an outstanding position of leadership in the manufacture of oil tempered wire.

Available in a complete range of sizes, Wickwire oil tempered wire is supplied either round or flat, in coils or in cut lengths.

The long experience and skilled craftsmanship of our metallurgists and mill men is at your service. Whatever your needs, it pays to remember: For the Wire You Require—Check First With Wickwire.

For additional information write or phone our nearest sales office.

THE COLORADO FUEL & IRON CORPORATION, Denver, Colorado
THE CALIFORNIA WIRE CLOTH CORPORATION, Oakland, California
WICKWIRE SPENCER STEEL DIVISION, Atlanta • Boston • Buffalo
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WICKWIRE WIRE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

looking for a way out?

When production schedules have you in the rough, and you need a way out—come to Crucible. Although present restrictions on steel production have reduced our warehouse stock, you'll find that any one of Crucible's 23 warehouses have as complete a stock of special purpose steels as offered by anyone—and can give immediate delivery of most steels. We probably have just what you need!—particularly tool steels.

Crucible is pledged to maintain as much warehouse stock as possible, that's why you may find that "hard-to-get" steel in a Crucible warehouse. Then too, Crucible offers you metallurgical advice to help you use steel in your application to greater advantage. Our warehouse people are anxious to serve you. Call on your nearest Crucible warehouse.

Stocks maintained of:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits and Hollow Drill Steel) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . AISI Alloy, Machinery, Onyx Spring and Special Purpose Steels.

CRUCIBLE first name in special purpose steels

51 years of Fine steelmaking **WAREHOUSE SERVICE**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

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set and a switch thrown to start the apparatus.

There are no moving parts to maintain. An extra large plate area obviates the need for a fan and there are no commutators or brushes to be lubricated or create friction. Temperature compensation is built into the charger affording identical protection to both old and new batteries, whether fully or partially charged, either in a cold or warm area. Unit is available for either lead-acid or nickel-alkaline batteries, and can be plugged into a standard 110-115 v 60-cycle outlet. A step-down transformer is furnished for 220 v outlets.

Check No. 8 on Reply Card for more Details

Shaves Big Gears

A Red Ring gear shaving machine for both internal and external spur and helical gears with face widths up to 40 inches and pitch diameters up to 100 inches is a development of National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. It is applicable to gears used in tanks, power shovels, mine hoists, large speed reducers, stationary prime movers and marine drive units. Shaving is accomplished by the rotary crossed axes principle with the work gear driving the cutter. Design includes independently driven rotary work table and a column which moving horizontally carries the cutter head to and feeds it into the work. Cutter head reciprocates in its vertical slide across the face of the work.

Work gear with its axis vertical

fishin' is fun . . . with care on the run

Here's a fellow that enjoys complete relaxation. He knows his plant is safeguarded from fire . . . a short circuit, a stray spark, a forgotten cigarette or spontaneous combustion can't cut into production time, destroy valuable records or endanger the lives of employees.

You too, can have this same peace of mind about fire by fully protecting your investment in materials, equipment and buildings with modern, approved C-O-TWO Fire Protection Equipment.

No matter what your property . . . factory, mill, warehouse, power station or research center . . . or a particular fire hazard such as spray booth, dip tank, pump room, electrical equipment enclosure or record vault . . . there is a type of C-O-TWO Fire Protection Equipment that gives you fast, positive action the instant fire strikes. Whether it's a C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguisher for an incipient fire, or a C-O-TWO Built-In High Pressure or Low Pressure Carbon Dioxide Type Fire Extinguishing System for total flooding an entire fire hazardous area . . . C-O-TWO means experienced engineering that assures you of the best type equipment for the particular fire hazard concerned.

For example, at many locations a C-O-TWO Combination Smoke Detecting and Fire Extinguishing System is a "must". The first trace of smoke in a protected area sounds an alarm . . . then fast, clean, non-damaging, non-conducting carbon dioxide blankets the fire, putting it out in seconds, before it spreads and causes extensive damage.

So, let an expert C-O-TWO Fire Protection Engineer help you in planning complete and up-to-date fire protection facilities now. Write us today for complete free information . . . our experience is at your disposal.

C-O-TWO

C-O-TWO FIRE EQUIPMENT COMPANY

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Sales and Service in the Principal Cities of United States and Canada

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MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
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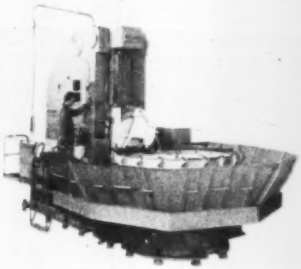
WILLSON®
plastic face and eye protection
keeps you on the safe side
WILLSON MONOGOGGLE
Outstanding MonoGoggle® Features:
Wide Angle Vision • Replaceable Lens • Front and Side Protection • Fits Over Spectacles • Lightweight Comfort
FEATHERSPEC
PROTECTO-SHIELD®
See your Willson distributor or write for bulletin.
WILLSON PRODUCTS, Inc., 233 Washington St., Reading, Pennsylvania

is clamped in a fixture mounted on a large rotary work table. There are no projecting machine elements above the table to interfere with handling heavy gears as they are loaded. Table speed is selective over a wide range by means of change



gears. A single motor drives the column horizontally and the cutter head slides vertically. Cutter head slide is mounted on a rigid tilting mechanism which can be adjusted to assure the path of reciprocation being in parallel with the work gear axis. This mechanism is also used when it is desired to taper shave the work gear teeth.

Check No. 9 on Reply Card for more Details

Accurate Cable Measurement

Accurate measurement of electric cable, wire rope, etc., from $\frac{3}{8}$ to $1\frac{1}{2}$ inches in diameter is possible with a cable meter made by Hykon Mfg. Co., 163 E. State St., Alliance, O. Meter swivels about a vertical axis for easier cable handling.

Mounter operates forward or backward and can be manually reset to a positive zero. It automatically decouples as material end passes through meter. Steel meter wheel is machined to close tolerance, giving ample pressure and no slippage. Accessories available are an adjustable height stand and either a lag-down base or a 100-pound, 18-inch diameter pedestal base.

Check No. 10 on Reply Card for more Details

High Vacuum Pump

Model 812-F Microvac pump made by the F. J. Stokes Machine Co., Philadelphia 20, Pa., has a capacity of 500 cfm and is suitable for any type of vacuum processing work. It is a water-cooled unit which operates at 390 rpm with a top-mounted 25 hp motor. Net weight is 2400 pounds, height is 76 inches and it occupies a 36 x 38-inch floor space.

It operates at a high volumetric efficiency due to the complete discharge of air at each stroke, with

Over the Long Haul

The FERRY CAP Spring Bolt *Proves its Mettle*

This Ferry Cap Spring Bolt is one of hundreds of different designs which we make for leading truck manufacturers. We manufacture them to various head shapes, with oil holes and grooves of different kinds, and flats accurately milled. Precision is a principle at Ferry Cap.

The bolt has maximum ground surface-wearing qualities. It is case hardened to proper depth, achieving a hard surface with a relatively soft core, assuring both long wear and high fatigue strength. The thread end is annealed to make it tough, but not brittle—more than equal to the required thread strength.

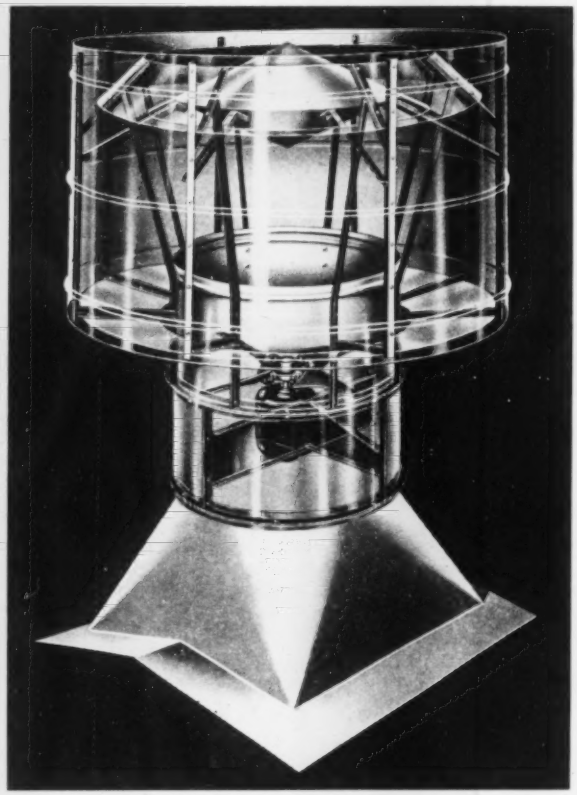
The body is ground to close tolerance, oil holes expertly drilled, and flats milled to a smooth, true surface to allow free flow of lubricants. The cotter holes, accurately drilled, are free from burrs. Result—the bolt fits perfectly.

It is a spring bolt of which any truck manufacturer can well be proud—a clean cut, precision-made, long-wearing, tough, dependable product.

The FERRY CAP & SET SCREW Co.

2159 SCRANTON ROAD • • • • • CLEVELAND 13, OHIO

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS



BURT FREE-FLOW FAN VENTILATOR

A DUAL-PURPOSE UNIT WITH OUTSTANDING CAPACITY

With power off, the Burt Free-Flow Fan Ventilator, operating as a gravity unit, usually supplies all normal exhaust needs. But when production operations create high temperatures or excessive dust, fumes, etc. its high velocity fan quickly (about six times faster) exhausts the extra heat and impurities. Positive ventilation is assured *always*. Sized from 12" with a rated capacity of 1040 C.F.M. to 84" giants rated at 99050 C.F.M. Discharge is vertically upward to protect roof from corrosive fumes or smoke present in the exhausted air. For more complete details see Sweet's or write for Bulletin SPV-10A.

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

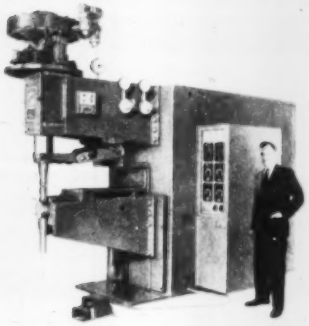
905 So. High St. Akron II, Ohio

no chance for re-expansion. Only four moving parts and low relative surface motion of piston to housing mean minimum wear and low upkeep. Slugs of liquid are discharged without injury to the pump. Oil reservoir is located in the pump base where lubricating oil settles when pump is shut down and vacuum is broken.

Check No. 11 on Reply Card for more Details

Production Welds Aluminum

Up to two thicknesses of $\frac{1}{4}$-inch aluminum alloys can be spot welded on a heavy production basis with the PMCO-6ST machine made by Sciaky Bros. Inc., 4915 W. 67th St. Chicago 38, Ill. In tests conducted



on a panel containing 100 spot welds shear strength values of plus or minus 7 per cent were obtained and the weld nuggets were entirely free of cracks or porosities, thus exceeding armed forces specifications.

A rapid rate of rise of the forging pressure is achieved through the use of a frictionless diaphragm pneumatic pressure system. Wave shapes are adjustable to suit any given spot welding application by virtue of the company's three-phase, Modu-Wave system. Peak short-circuit tip-to-tip current is 225,000 secondary amperes, corresponding to a primary demand of 1700 kva.

Check No. 12 on Reply Card for more Details

Lifting Work Eliminated

Lewis-Shepard Products Inc., 191 Walnut St., Watertown 72, Mass., announces a piece of positioning equipment called the working height lifter. Lifting, stopping and lowering of the load are controlled by remote pedal switches which can be conveniently located since they are mounted on a single steel plate at the end of a 15-foot rubber electrical cord.

Mechanism consists of a 1 3-hp.

Why tap?

TYPE 23 . . . standard threads with extra wide thread-cutting slot.

TYPE 1 . . . standard threads, ideal for steel.

TYPE 25 . . . for plastics with spaced threads to minimize stripping.

SAVE TIME AND MONEY WITH SHAKEPROOF

T. M. Reg. U. S. Pat. Off.

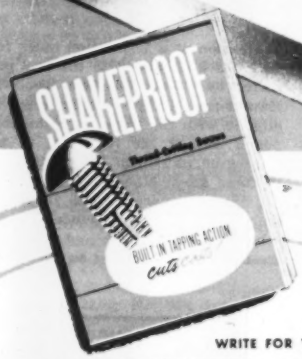
THREAD-CUTTING SCREWS

AND GET STRONGER, TIGHTER FASTENINGS, TOO!

separate tapping is completely eliminated—no tapping time or tool costs!

each screw fits tight in its own self-cut, mating thread—powerfully resists loosening!

[illegible] strength permits use of smaller or fewer fastenings—saving space and weight.



WRITE FOR YOUR FREE COPY OF THIS BOOKLET TODAY . . . and see how SHAKEPROOF Thread-Cutting Screws will speed urgent production in your plant.

SHAKEPROOF inc.

"Fastening Headquarters"

Trade Mark

A DIVISION OF ILLINOIS TOOL WORKS

2501 North Keeler Avenue • Chicago 39, Illinois

In Canada: Canada Illinois Tools Ltd., Toronto, Ontario

115 v, 60 cycle, ac motor connected to a piston pump which delivers oil under pressure to the hydraulic lifting ram. Unit is made in 4000 pounds capacity, 42 inches lifting height, 72 inches overall height in platform lengths of 36, 42, 48 and 54 inches and in platform widths of 32 or 38 inches.

Check No. 13 on Reply Card for more Details

Synthetic Resin Cement

Atlas Mineral Products Co., Mertztown, Pa., announces Alfane, a light colored synthetic resin cement that is resistant to most acids, salts, solvents, greases and to all alkalies. It sets hard in contact with concrete and metals and has good adhesion properties for jointing brick and tile and adhering glass, concrete, metals and other materials.

Check No. 14 on Reply Card for more Details

Snap-Action Plugs

Positive snap-action knockout plugs, introduced by Buchanan Electrical Products Corp., Hillside, N. J., provide effective means for accomplishing permanent closure of unused knockout holes in electrical device or outlet boxes. Fabricated from heavy gage stamped steel, they are available in sizes to fit all five standard knockouts $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$ and $1\frac{1}{2}$ inches.

Check No. 15 on Reply Card for more Details

Machinists' Vises

Columbian Vise & Mfg. Co., Cleveland 4, O., offers an improved line of malleable iron machinists' vises that features the use of a new type graphite bronze, self-lubricating thrust bearing located at the front of the sliding jaw. This absorbs thrust of the steel screw head, provides easy and positive operation and also prevents wear and eliminates end play. Vises are made in all standard sizes 3 to 8-inch jaw widths.

Check No. 16 on Reply Card for more Details

Surface Tension Instrument

For rapid and accurate measurement of surface tension, the Sur-Ten meter is announced by Joseph B. Kushner Laboratories, Stroudsburg, Pa. It is recommended for use where there is a need for a quick method for determining the surface tension of a process liquid or liquids.

Check No. 17 on Reply Card for more Details

For Welders with Bifocals

Weld-Aid is designed by Willson Products Inc., Reading, Pa., for welders who wear bifocals. The lens is inserted in the vision slit on the welding helmet or handshield and replaces the lost segment power that is cut off because their glasses fall below the vision slit of the helmet.

Check No. 18 on Reply Card for more Details

Carbon Control

Dietert-Detroit two minute carbon determinator and melters carbon test, made by Harry W. Dietert Co., Detroit 4, Mich., will give fast and accurate carbon analysis. For irons and organics, the determinator is used with the company's Varitemp furnace. When melting steel, the melters carbon test will give carbon content within two points in a minute.

Check No. 19 on Reply Card for more Details

Phosphate Treatment for Metals

Anchorite 100, a new phosphate compound for treating metallic parts, is introduced by Octagon Process Inc., Staten Island 1, N. Y. Its phosphatizing action changes the surface of steel, iron, zinc and cadmium parts into an inert phosphate compound that is resistant to corrosion and provides a good base for organic coatings. It acts as an insulating barrier between the metal and paint. The compound may be applied by immersion or spray.

Check No. 20 on Reply Card for more Details

Precision Gage Blocks

Solid carbide precision gage blocks are now available from Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., in sizes 0.050-inch up to and including 4.000 inches. They are sold in sets, individually to replace worn steel blocks, and as wear blocks in sizes 0.050-inch and 0.100-inch.

Check No. 21 on Reply Card for more Details

Flux-Coated Aluminum Rods

Eutectic Welding Alloys Corp., Flushing, N. Y., announces flux-coated aluminum welding rods for oxy-acetylene and oxyhydrogen welding. Silicon-free EutecRod 22Fc is low melting to provide for minimum heat application and once melted, flows in a transparent pool permitting welder to watch the progress of the work.

Check No. 22 on Reply Card for more Details

Tapping Attachment

With the S.P.V. tapping attachment, developed by Eric S. Johnson Co., Chicago 11, Ill., it is possible to machine tap holes at a cutting speed of 300 feet per minute and to tap blind holes in light metal on an ordinary drilling machine using spindle speeds of up to 2500 rpm. Friction in the axial motion of the tap relative to the tapping attachment has been eliminated as much as possible. A slipping clutch prevents overloading and automatically arrests tap when it reaches the bottom of the hole.

Check No. 23 on Reply Card for more Details

Basic Switches

Micro Switch, division of Minneapolis-Honeywell Regulator Co., Free-Port, Ill., is now offering rigid lever actuated high capacity basic switches in a new V series of their type A basic switches. The actuators are located in the same positions as those of other type A basic switches and there is a choice of a long straight lever, a short lever with a roller and a long lever with a roller.

Check No. 24 on Reply Card for more Details

Carbide Drill

Raymac Mfg. Co., Detroit 1, Mich., has developed a new carbide drill that does not fuse through metal but cuts. It operates at a much lower speed than other drills.

Check No. 25 on Reply Card for more Details

Adjustable Door Fastener

Speed of installation, ability to compress a gasket, and adaptability to almost any door and frame thickness are features of the Southco adjustable pawl fastener, available from South Chester Corp., Philadelphia 2, Pa. Installed by drilling three holes and applying two rivets, the fastener fits through the door panel.

Check No. 26 on Reply Card for more Details

Tool Post Turret

Addition of a 12-position index feature has been added to the tool post turret by Crozier Machine Tool Co., Hawthorne, Calif. Turret may be aligned with the work with the compound rest of the lathe set at any 30 degree increment. It is available in three sizes: Model 61 with a body 5⅝ inches square; model 41 with a body 4 inches square; model 31 with a body 3 inches square.

Check No. 27 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

75. Pointing Machine

Economy Engineering Co.—Specifications and operating details of type 4600 automatic pointing machine are contained in 4-page illustrated bulletin. Roulette type machine has a bolt or cap screw capacity of ¼ to ¾-in. diameter and 1 to 6-in. length.

76. Precision Castings

Alloy Precision Castings Co.— 8-page illustrated brochure "The Ultimate in Precision Castings" is devoted to engineering, metallurgical and other aspects of Mercast process of producing precision castings. Step-by-step procedures used in making parts are shown pictorially. Castings are produced in wide range of ferrous and nonferrous metals.

77. Welding Accessories

Empire Products, Inc., Cam-Lok Div.—4-page bulletin 101 on arc welding accessories covers features and advantages of cable connectors, electrode holders and terminal connections made by company. Photos, cross sectional drawings and specifications are given.

78. Rust Preventive

Nox-Rust Chemical Corp. — Wall chart No. 451 measuring 17 x 22 in. lists uses, minimum protection time, application and removal, physical description and miscellaneous data of various Nox-Rust compounds used as protective coatings for metal parts and machinery. Preservatives meeting various Federal and military specifications are presented.

79. Presses

Dake Engine Co.—16-page illustrated catalog No. 129 outlines features and presents specifications of air, hand and electrically operated hydraulic presses and utility, arbor and custom engineered presses with pressures up to 125 tons.

80. Circuit Breaker Panels

Westinghouse Electric Corp.—20-page illustrated bulletin B-5260 describes circuit breaker panelboards for the control and protection of lighting, appliances and other equipment and of the circuits that supply them De-ion circuit breakers in capacities from 10 to 100 amp are offered for complete range of commercial and industrial requirements.

81. Steam Traps

W. H. Nicholson & Co.—32-page illustrated catalog No. 751 describes: five types of thermostatic steam traps for pressures up to 225 lb; two types of expansion steam traps for pressures up to 250 lb; three types of weight-operated traps for steam, air, gasoline pressures up to 1500 lb; piston-operated steam traps for pressures up to 650 lb; and three types of steam, air and gas separators.

82. Equipment Drives

Morse Chain Co. — 16-page illustrated broadside No. F72-51 is entitled "Revolutionizes Power Transmission." Details are presented on the new HyVo drive which transmits up to 5000 hp in single unit. This chain drive unit operates smoothly without vibration at high speeds.

83. Hobbing Machines

Lees-Bradner Co.—8-page illustrated circular No. 84 offers data on model 7-A production hobbing machines available in one, four, six and eight units. Component parts and assemblies are shown in exploded view, and specifications are listed.

84. Snap-Action Switches

Minneapolis-Honeywell Regulator Co., Micro Switch Div.—Representative types of precision snap-action switches in line of over 5000 switches are covered in 4-page illustrated bulletin No. 54. Data and brief descriptions are given on heavy and medium duty limit, explosionproof, high capacity and die cast enclosed, basic and V3 switches and actuators.

85. Air & Hydraulic Equipment

Logansport Machine Co. — "The Facts of Life on Air and Hydraulic Devices" is illustrated booklet which presents concise data on the "do", "don't" and "what to look for" phases of setting up and servicing this type of equipment.

86. Plastic-Coated Metal Tubing

Samuel Moore & Co.—Advantages of using plastic-coated metal tubing for connecting industrial instruments where corrosive conditions exist are outlined in 2-page illustrated bulletin "Dekoron Instrument Tubing." Service data for a number of severe conditions are given.

87. Constant Delivery Pumps

Oilgear Co.—Three constant delivery axial piston pumps for pressures up to 3000 and 5000 psi are described in 4-page illustrated bulletin 46601. Units are suitable for heavy-duty pushing, pulling, lifting and lowering, and for maintaining high static loads on large clamping rams in metalworking, plastic, automotive, rubber, printing, lumber and textile industries.

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HELPFUL LITERATURE

88. Tube & Pipe Bending

Pines Engineering Co.—"Pines Engineering News" is illustrated bimonthly publication which deals with operation and applications of automatic tube bending machines, tube and rod end-finishing equipment, and tube fabricating techniques. It will be sent regularly to plant personnel concerned with production bending and fabricating of tubing, pipe, rods and bars.

89. Nondestructive Inspection

Magnaflux Corp. — Complete information regarding procedures, applications and equipment employed by the new Zyglo nondestructive testing method is given in 8-page illustrated bulletin 1602-5. This fluorescent penetrant inspection method detects surface flaws in all types of metals, ceramics, glass, plastics and other solid materials.

90. Mobile Crane

R. G. LeTourneau, Inc.—Tournacrane, the one-man machine which handles up to 30,000-lb loads reaches out up to 35 ft or raises loads 35 ft, is described in 4-page illustrated bulletin C-648. This diesel powered machine is extremely versatile.

91. Floor Maintenance

Monroe Co.—A graphic comparison of old and new methods of floor repair and resurfacing is feature of illustrated folder 120-11. Described is Swift-Floor, and easily used flooring material over which 50,000-lb loads can be rolled 60 seconds after application is completed.

92. AC Contactors

Ward Leonard Electric Co.—4-page illustrated bulletin 4458 gives features, application, construction, ratings and operating principle of size 0, 15-amp, solenoid type ac contactors. Dimensional diagrams as well as ordering information are also included.

93. Recessing Tools

Scully-Jones & Co.—12-page illustrated bulletin No. 10-50 describes standard types J and C and type R automatic recessing tools. Types J and C are designed to pilot in a fixture bushing, while type R pilots in the hole and stops on face of work. Set-up procedures on drill presses and single or multiple spindle machines are given as well as instructions for grinding and setting tools. Separate price list is provided.

94. Bearing Housing Rings

General Motors Corp., New Departure Div.—2-page folder entitled "Rubber Housing Rings for Ball Bearings" tabulates dimensions of rubber housing rings for bearings up to and including three-bore extra-light, two-bore light and one-bore medium series. Information will assist bearing users requiring cushioning medium between bearing and housing for vibration absorption and noise reduction.

95. Variable Speed Drive

Metron Instrument Co.—Illustrated data sheet No. 4C presents application information on miniature variable-ratio speed changer which is continuously variable over range from 1/6 to 6 by total travel of 0.375-in. of push rod control.

96. Suspended Arches

George P. Reintjes Co.—Suspension of basic tile arches in open hearth furnaces is subject of 4-page bulletin No. 651 entitled "Reintjes Basic Suspended Arches." In Fairing construction, tiles are supported singly or in pairs at elevations desired in order to provide maximum burning depth for each tile. Arch supports, beam and support castings are described.

97. Hydraulic Presses

C. A. Lawton Co.—18-page illustrated folder contains condensed data on line of hydraulic presses which includes platen, drawing, molding, testing, grinding wheel and special types. Information is listed also on hydraulic cylinders.

98. Portable Pipe Machine

Peerless Machine Co.—8-page bulletin 62 describes and illustrates Threadfast portable pipe machine for cutting, reaming and threading pipes and solid rounds. Component parts and assemblies are shown and explained.

99. Crimped Metals

Rigidized Metals Corp.—8-page illustrated folder CFI 551 presents suggested uses for stainless Rigidized sheet metals. Typical examples of advantages obtained in Army and Navy use are tabulated. Pictures show full-size texture and crimp of eight different patterns used to obtain desired strength features or designs.

100. Tool Steels

Raven Steel & Tool Co., sole American agents for Bohler Bros. & Co., Ltd. of Austria—36-page booklet entitled "Bohler Tool Steel" offers general information on properties and treatment of unalloyed and alloyed tool steels made from ore mined in Austria. Various brands are classified and technical data on each are given. Complete weight and temperature conversion tables are included.

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10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

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Case of the fractured bend

Southeastern Tool & Die Company, Birmingham, Alabama, was faced with a serious problem. They were getting fractures while roll-forming structural members from Kaiser Aluminum.

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He supervised removal and machining of the die to correct tolerance. Result: A smooth-functioning roll-forming operation.

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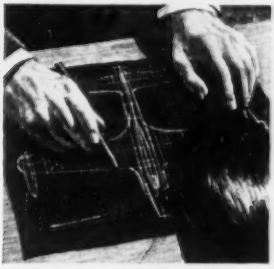

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LAKE SUPERIOR IRON ORE • FERRO ALLOYS
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THE Cleveland-Cliffs IRON COMPANY
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The Market Outlook

STEEL distribution will be just as tangled in fourth quarter as it is at present. That's the view of industry leaders today as they seek to appraise their position amid the confusion existing in the various product markets. Despite high hopes of Washington officials that demand-supply balance will be pretty well achieved under the Controlled Materials Plan before fourth quarter is too far along, steel mill executives are anything but sanguine on this score. As far as they can determine from their present position, turmoil in distribution will be experienced right into first quarter of next year.

RESCHEDULING — Extensive rescreening of the fourth-quarter steel order load appears inescapable. Cutbacks in allotments, it is maintained, will be necessary if space in rolling schedules is to be found for defense and defense-support requirements still to be placed. The resulting rescheduling, along with inclusion of added certifications stemming from closing the open-end of CMP, and piling on of directives is thought bound to keep the market in a muddle.

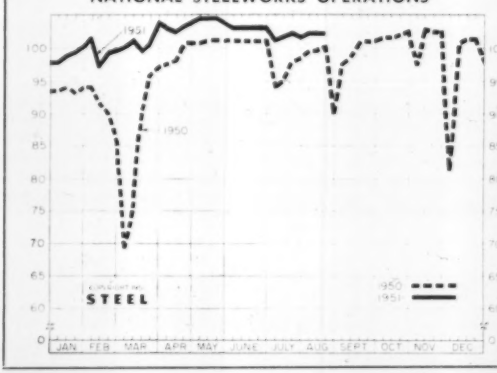
SUPPLY—The supply outlook is especially distressing in such major products as plates, structural shapes and bars. Producers of such items already are practically fully committed for the quarter, and much tonnage still remains to be scheduled in both the A and B classifications under CMP. Structural fabricators are predicting widespread curtailment in output in the closing weeks of the year unless something is done to assure them steel supplies.

INVENTORIES—While acute steel supply conditions threaten over coming months, here and there evidence is coming to light indicating rising inventories at some consumers' plants. Checks are revealing much more steel in bins than had been realized. Indications are some consumer durable goods makers have been taking in steel steadily in the face of declining orders for their finished goods. As a result their steel stocks are up, and this is resulting in a trickle of tonnage cancellations to the mills. Significantly, in this connection, there has been no stampede of consumer durable manufacturers to file their fourth quarter tonnage requests under CMP by the Aug. 15 deadline.

WAREHOUSES — In any event, newly ticketed consumers will receive no more tonnage under CMP than is now available to them from the so-called "free" area of supply. More equitable rationing to all consumers may be possible, however, once the system is working smoothly. Larger consumers who normally hold competitive advantages in a free market will likely be hurt to some extent. Meanwhile, increasing dependence probably will be placed on the warehouses to provide tonnage for consumers unable to obtain position on mill books. That this is a likely possibility is seen in the fact NPA has under consideration a proposal to increase the warehouse monthly steel allotment to possibly 100 per cent of the base period. In event this increase is effected, and its chances appear good, the warehouse take of carbon products will rise about 75,000 tons monthly to 500,000 tons.

CLOSED CMP—Just how soon the open-end of CMP will be closed completely still is a matter for speculation. While NPA announced a week ago that all consumers, including manufacturers of automobiles, appliances and other consumer durables, would be brought under the CMP umbrella beginning Oct. 1, it now appears this announcement was a little premature. At any rate, it now seems NPA is resigned to the fact it will be impossible for all consumers to get under the CMP umbrella by that date. Consequently, an area of "free" steel supply will have to be maintained for some time to care for many manufacturers who now face being left out in the cold as regards supplies in the existing over-committed position of the mills. In the circumstances, it looks as though the open end of CMP will not be completely closed before Nov. 1, if then.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Aug. 18	Change	Same Week 1950	Same Week 1949
Pittsburgh	99.5	+ 1	102	70
Chicago	105	0*	101	90
Mid-Atlantic	100.5	0	98.5	75.5
Youngstown	106	0	106	88
Wheeling	98.5	+ 0.5	96.5	91.5
Cleveland	106	+ 1	101	99
Buffalo	104	0	104	101
Birmingham	100	0	87	100
New England	90	— 2	85	62
Cincinnati	106	+ 5	103	87
St. Louis	91.5	+ 1	91	87
Detroit	106	+ 7.5*	102	96
Western	104	+ 1	99	70
Estimated national rate	102	0	100	83.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 29 Production-Engineering News—p. 65

Composite Market Averages

	Aug. 16 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av. 100)	171.92	171.92	171.92	156.99	112.04
Index in cents per lb	4.657	4.657	4.657	4.253	3.035
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$94.50	$64.45
No. 2 Fdry. Pig Iron, GT	52.04	52.04	52.04	46.83	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	47.49	28.79
Steelmaking Scrap, GT	44.00	44.00	44.00	40.67	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 18, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethelehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Aug. 16 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.20	4.20	4.20	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10-15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.91	3.91	3.91	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.60	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.30	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, $\frac{1}{2}$-$\frac{9}{32}$", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47-$50	$29.00
Basic Valley	52.00	52.00	52.00	46.00	28.00
Basic del. Phila.	56.49	56.49	56.49	50.39	29.93
No. 2 Fdry. Pitts.	52.50	53.50	52.50	49.50	28.50
No. 2 Fdry. Chicago	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry. Valley	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry. Del. Phila.	56.99	56.99	56.99	50.89	30.43
No. 2 Fdry. Birm.	48.88	48.88	48.88	42.38	24.88
No. 2 Fdry (Birm.)del. Cin.	55.33	55.33	55.33	49.08	28.94
Malleable Valley	52.50	52.50	52.50	46.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.00	$45.00	$45.00	$46.00	$20.00
No. 1 Heavy Melt, E. Pa.	43.50	43.50	43.50	37.50	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	43.50	38.50	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	45.00	46.25	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	43.25	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	44.00	39.75	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	46.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	49.00	20.00

* F. o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	19.50	9.50
Oven, Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	22.50	14.375
Zinc, E. St. Louis	17.50	17.50	17.50	15.00	8.25
Lead, St. Louis	16.80	16.80	16.80	12.80	8.10
Tin, New York	103.00	103.00	106.00	101.00	52.00
Aluminum, del.	19.00	19.00	19.00	17.50	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn,N.Y., del.	....	58.69	59.46	....
Newark,del.	56.74	57.24	57.74	58.24
Philadelphia,del.	56.49	56.99	57.49	57.99
Birmingham District				
AlabamaCity,Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward,Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.33	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda,N.Y. W12	52.00	52.50	53.00	....
No.Tonawanda,N.Y. T9	....	52.50	53.00	....
Boston, del.	61.63	62.13	62.63	....
Rochester,N.Y., del.	54.74	55.24	55.74	....
Syracuse,N.Y.,del.	55.72	56.22	56.72	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
IndianaHarbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago,Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	53.97	54.47	54.47	54.97
Muskegon,Mich., del	....	58.20	58.20	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, del. from Cleve.	54.49	54.99	54.99	55.49
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	....	55.25	55.75	....
Fontana,Calif. K1	58.00	58.50	....	....
Geneva,Utah G1	52.00	52.50	....	....
Seattle,Tacoma,Wash.,del.	....	60.35	....	....
Portland,Oreg.,del.	....	60.35	....	....
LosAngeles,SanFrancisco,del.	59.85	60.35	....	....
GraniteCity,Ill. G4	53.90	54.40	54.90	....
St.Louis,del. (inc. tax)	54.66	55.16	55.66	....
Ironton,Utah C11	52.00	52.50	....	....
LoneStar,Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Nevillelsland,Pa. P6	....	52.50	52.50	53.00
Pitts.,N.&S. sides, Ambridge, Aliquippa,del.	....	53.74	53.74	54.24
McKeesRocks, del.	....	53.49	53.49	53.99
Lawrenceville, Homestead, McKeesport,Monaca del.	....	54.00	54.00	54.50
Verona,del.	....	54.48	54.48	54.98
Brackenridge,del.	....	54.72	54.72	55.22
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monessen,Pa. P7	54.00	....	....	....
Sharpsville,Pa. S6	....	....	52.50	53.00
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Swedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati,del.	57.21	57.71	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield,O.,del.	56.43	56.93	56.93	57.43

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls,N.Y. P15	$88.00
Keokuk,Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia, delivered	63.12
Troy,N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Aug. 16, 1951; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ... $79.00
Munhall,Pa. U5 ... 52.00

INGOTS, Alloy (NT)
Detroit R7 ... $54.00
Fontana,Calif. K1 ... 80.00
Houston,Tex. S5 ... 62.00
Midland,Pa. C18 ... 54.00
Munhall,Pa. U5 ... 54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ... $56.00
Clairton,Pa. U5 ... 56.00
Ensley,Ala. T2 ... 56.00
Fairfield,Ala. T2 ... 56.00
Fontana,Calif. K1 ... 75.00
Gary, Ind. U5 ... 56.00
Johnstown,Pa. B2 ... 56.00
Lackawanna,N.Y. B2 ... 56.00
Munhall,Pa. U5 ... 56.00
So.Chicago,Ill. U5 ... 56.00
So.Duquesne,Pa. U5 ... 56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ... $66.00
Buffalo R2 ... 66.00
Canton,O. R2 ... 66.00
Clairton,Pa. U5 ... 66.00
Cleveland R2 ... 66.00
Conshohocken,Pa. A3 ... 73.00
Detroit R7 ... 69.00
Ensley,Ala. T2 ... 66.00
Fairfield, Ala. T2 ... 66.00
Fontana,Calif. K1 ... 85.00
Gary,Ind. U5 ... 66.00
Geneva,Utah G1 ... 66.00
Houston,Tex. S5 ... 74.00
Johnstown,Pa. B2 ... 66.00
Lackawanna,N.Y. B2 ... 66.00
LosAngeles B3 ... 85.00
Munhall,Pa. U5 ... 66.00
Seattle B3 ... 85.00
So.Chicago R2,U5,W14 ... 66.00
So.Duquesne,Pa. U5 ... 66.00
So.SanFrancisco B3 ... 85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ... $70.00
Buffalo R2 ... 70.00
Canton,O. R2 ... 70.00
Canton,O. (29) T7 ... 66.00
Conshohocken,Pa. A3 ... 77.00
Detroit R7 ... 73.00
Fontana,Calif. K1 ... 89.00
Gary,Ind. U5 ... 70.00
Houston,Tex. S5 ... 78.00
Ind.Harbor,Ind. Y1 ... 70.00
Johnstown,Pa. B2 ... 70.00
Lackawanna,N.Y. B2 ... 70.00
LosAngeles B3 ... 90.00
Massillon,O. R2 ... 70.00
Midland,Pa. C18 ... 70.00
Munhall,Pa. U5 ... 70.00
So.Chicago R2,U5,W14 ... 70.00
So.Duquesne,Pa. U5 ... 70.00
Struthers,O. Y1 ... 70.00
Warren,O. C17 ... 70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ... $82.00
Cleveland R2 ... 82.00
Fontana,Calif. K1 ... 103.00
Gary,Ind. U5 ... 82.00
Massillon,O. R2 ... 82.00
So.Chicago,Ill. R2 ... 82.00
So.Duquesne,Pa. U5 ... 82.00

SHEET BARS (NT)
Fontana,Calif. K1 ... $89.00

SKELP
Aliquippa,Pa. J5 ... $3.45
Munhall,Pa. U5 ... 3.35
Warren,O. R2 ... 3.35
Youngstown, R2, U5 ... 3.35

WIRE RODS
AlabamaCity,Ala. R2 ... 4.10
Buffalo W12 ... 4.10
Cleveland A7 ... 4.10
Donora,Pa. A7 ... 4.10
Fairfield,Ala. T2 ... 4.10
Fontana,Calif. K1 ... 4.90
Houston,Tex. S5 ... 4.50
Johnstown,Pa. B2 ... 4.10
Joliet,Ill. A7 ... 4.10
LosAngeles B3 ... 4.90
Minnequa,Colo. C10 ... 4.35
Monessen,Pa. P7 ... 4.30
No.Tonawanda,N.Y. B11 ... 4.10
Pittsburg,Calif. C11 ... 4.75
Portsmouth,O. P12 ... 4.30
Roebling,N.J. R5 ... 4.20
So.Chicago,Ill. R2 ... 4.10
SparrowsPoint,Md. B2 ... 4.20
Sterling,Ill.(1) N15 ... 4.10
Struthers,O. Y1 ... 4.10
Torrance,Calif. C11 ... 4.90
Worcester,Mass. A7 ... 4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ... 4.45
Lackawanna,N.Y. B2 ... 4.45
Munhall,Pa. U5 ... 4.45
So.Chicago,Ill. U5 ... 4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ... 3.60
Aliquippa,Pa. J5 ... 3.65
Bessemer,Ala. T2 ... 3.65
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fairfield,Ala. T2 ... 3.65
Fontana,Calif. K1 ... 4.25
Gary,Ind. U5 ... 3.65
Geneva,Utah G1 ... 3.65
Houston,Tex. S5 ... 4.05
Ind.Harbor,Ind. I-2 ... 3.65
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.25
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.25
Minnequa,Colo. C10 ... 4.10
Munhall,Pa. U5 ... 3.65
Niles,Calif.(22) P1 ... 4.85
Phoenixville,Pa. P4 ... 4.95
Portland,Oreg. O4 ... 4.50
Seattle B3 ... 4.30
So.Chicago,Ill. U5, W14 ... 3.65
So.SanFrancisco B3 ... 4.20
Torrance,Calif. C11 ... 4.25
Weirton,W.Va. W6 ... 3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ... 4.35
Fontana,Calif. K1 ... 5.55
Munhall,Pa. U5 ... 4.35
So.Chicago,Ill U5 ... 4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ... 5.50
Bessemer,Ala. T2 ... 5.50
Bethlehem,Pa.(14) B2 ... 5.50
Clairton,Pa. U5 ... 5.50
Fairfield,Ala. T2 ... 5.50
Fontana,Calif. K1 ... 6.10
Gary,Ind. U5 ... 5.50
Geneva,Utah G1 ... 5.50
Ind.Harbor,Ind. I-2 ... 5.50
Ind.Harbor,Ind. Y1 ... 6.00
Johnstown,Pa. B2 ... 5.50
Lackawanna,N.Y.(14)B2 ... 5.50
LosAngeles B3 ... 6.05
Munhall,Pa. U5 ... 5.50
Seattle B3 ... 6.10
So.Chicago,Ill. U5 ... 5.50
So.SanFrancisco B3 ... 6.00
Struthers,O. Y1 ... 6.00

Wide Flange
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fontana,Calif. K1 ... 4.65
Lackawanna,N.Y. B2 ... 3.70
Munhall,Pa. U5 ... 3.65
So.Chicago,Ill U5 ... 3.65

H.S, L.A. Wide Flange
Bethlehem,Pa. B2 ... 5.50
Lackawanna,N.Y. B2 ... 5.50
Munhall,Pa. U5 ... 5.45
So.Chicago,Ill. U5 ... 5.45

BEARING PILES
Munhall,Pa. U5 ... 3.65
So.Chicago,Ill. U5 ... 3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.65
Bessemer,Ala. T2 ... 5.65
Clairton,Pa. U5 ... 5.65
Cleveland,Pa. R2 ... 5.60
Conshohocken,Pa. A3 ... 5.90
Fairfield,Ala. T2 ... 5.65
Fontana,Calif.(30) K1 ... 6.25
Gary,Ind. U5 ... 5.65
Geneva,Utah G1 ... 5.65
Ind.Harbor,Ind. I-2 ... 5.65
Ind.Harbor,Ind. Y1 ... 6.15
Johnstown,Pa. B2 ... 5.65
Munhall,Pa. U5 ... 5.65
Pittsburgh J5 ... 5.65
Seattle B3 ... 6.55
Sharon,Pa. S3 ... 5.70
So.Chicago,Ill. U5 ... 5.65
SparrowsPoint,Md. B2 ... 5.65
Warren,O. R2 ... 5.65
Youngstown, Y1 ... 6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ... 4.85
Coatesville,Pa. L7 ... 5.25
Conshohocken,Pa. A3 ... 5.05
Fontana,Calif. K1 ... 5.70
Gary,Ind. U5 ... 4.75
Johnstown,Pa. B2 ... 4.75
Munhall,Pa. U5 ... 4.75
Sharon,Pa. S3 ... 5.20
So.Chicago,Ill. U5 ... 4.75
SparrowsPoint,Md. B2 ... 4.75

FLOOR PLATES
Cleveland J5 ... 4.75
Conshohocken,Pa. A3 ... 4.75
Harrisburg,Pa. C5 ... 5.95
Ind.Harbor,Ind. I-2 ... 4.75
Munhall,Pa. U5 ... 4.75
So.Chicago,Ill. U5 ... 4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ... 3.95
Ashland,l.c.l.(15) A10 ... 4.45
Cleveland,c.l. R2 ... 4.30
Warren,O.,c.l. R2 ... 4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ... 3.70
Aliquippa,Pa. J5 ... 3.70
Ashland,Ky.(15) A10 ... 3.70
Bessemer,Ala. T2 ... 3.70
Clairton,Pa. U5 ... 3.70
Claymont,Del. C22 ... 4.15
Cleveland J5, R2 ... 3.70
Coatesville,Pa. L7 ... 4.15
Conshohocken,Pa. A3 ... 4.15
Fairfield,Ala. T2 ... 3.70
Fontana,Calif.(30) K1 ... 4.30
Gary,Ind. U5 ... 3.70
Geneva,Utah G1 ... 4.40
Granite City,Ill. G4 ... 4.40
Geneva,Utah G1 ... 3.70
Harrisburg,Pa. C5 ... 4.95
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Minnequa,Colo. C10 ... 4.50
Munhall,Pa. U5 ... 3.70
Pittsburgh J5 ... 3.70
Seattle B3 ... 4.60
Sharon,Pa. S3 ... 3.95
So.Chicago,Ill. U5, W14 ... 3.70
SparrowsPoint,Md. B2 ... 3.70
Steubenville,O. W10 ... 3.70
Warren,O. R2 ... 3.70
Weirton,W.Va. W6 ... 4.00
Youngstown R2, U5, Y1 ... 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ... 5.45
Geneva,Utah G1 ... 4.85

PLATES, Wrought Iron
Economy,Pa. B14 ... 8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ... 3.70
Aliquippa,Pa. J5 ... 3.70
Alton,Ill(c) L1 ... 3.95
Atlanta,Ga. A11 ... 4.25
Bessemer,Ala. T2 ... 3.70
Buffalo R2 ... 3.70
Canton,O. R2 ... 3.70
Clairton,Pa. U5 ... 3.70
Cleveland R2 ... 3.70
Detroit R7 ... 3.85
Emeryville, Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.20
Minnequa,Colo. C10 ... 4.15
Niles,Calif. P1 ... 5.05
N.Tonawanda,N.Y. BM ... 3.70
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland,Oreg. O4 ... 4.65
Seattle B3, N14 ... 4.45
So.Chicago R2,U5,W14 ... 3.70
So.Duquesne,Pa. U5 ... 3.70
So.SanFran.,Cal. B3 ... 4.45
Struthers,O. Y1 ... 3.70
Torrance,Calif. C11 ... 4.40
Weirton,W.Va. W6 ... 3.85
Youngstown R2, U5 ... 3.70

BAR SIZE ANGLES, S. SHAPES
Aliquippa,Pa. J5 ... 3.70
Atlanta A11 ... 4.25
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Niles,Calif. P1 ... 5.05
Portland,Oreg. O4 ... 4.65
SanFrancisco S7 ... 4.85

BAR SIZE ANGLES,H.R. CARBON
Bethlehem,Pa. B2 ... 3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ... 4.30
Buffalo R2 ... 4.30
Canton,O. R2 ... 4.30
Canton,O.(29) T7 ... 3.95
Clairton,Pa. U5 ... 4.30
Detroit R7 ... 4.45
Ecorse,Mich. G5 ... 4.65
Fontana,Calif. K1 ... 5.35
Gary,Ind. U5 ... 4.30
Houston,Tex. S5 ... 4.70
Ind.Harbor,Ind. I-2, Y1 ... 4.30
Johnstown,Pa. B2 ... 4.30
Kansas City,Mo. S5 ... 4.90
Lackawanna,N.Y. B2 ... 4.30
LosAngeles B3 ... 5.35
Massillon,O. R2 ... 4.30
Midland,Pa. C18 ... 4.30
So.Chicago R2,U5,W14 ... 4.30
S.Duquesne,Pa. U5 ... 4.30
Struthers,O. Y1 ... 4.30
Warren,O. C17 ... 4.30
Youngstown U5 ... 4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ... 4.55
Gary,Ind. U5 ... 4.55
Youngstown U5 ... 4.55

BARS & SMALL SHAPES, H. R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.55
Bessemer,Ala. T2 ... 5.55
Bethlehem,Pa. B2 ... 5.55
Clairton,Pa. U5 ... 5.55
Cleveland R2 ... 5.55
Fairfield,Ala. T2 ... 5.55
Fontana,Calif. K1 ... 6.60
Gary,Ind. U5 ... 5.55
Ind.Harbor,Ind. I-2 ... 5.55
IndianaHarbor,Ind. Y1 ... 6.05
Johnstown,Pa. B2 ... 5.55
Lackawanna,N.Y. B2 ... 5.55
LosAngeles B3 ... 6.25
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 5.55
Seattle B3 ... 6.30
So.Duquesne,Pa. U5 ... 5.55
SoSanFrancisco B3 ... *6.30
Struthers,O. Y1 ... 6.05
Youngstown U5 ... 5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ... 4.55
BeaverFalls,Pa. M12,R2 ... 4.55
Buffalo B5 ... 4.60
Camden,N.J. P13 ... 5.00
Carnegie,Pa. C12 ... 4.55
Chicago W18 ... 4.55
Cleveland A7, C20 ... 4.55
Detroit P17 ... 4.70
Donora,Pa. A7 ... 4.55
Elyria,O. W8 ... 4.55
FranklinPark,Ill. N5 ... 4.55
Gary,Ind. R2 ... 4.55
GreenBay,Wis F7 ... 4.55
Hammond,Ind. L2, M13 ... 4.55
Hartford,Conn. R2 ... 5.10
Harvey,Ill. B5 ... 4.55
LosAngeles B3 ... 6.00
Mansfield,Mass. B5 ... 5.10
Massillon,O. R2, R8 ... 4.55
Monaca,Pa. S17 ... 4.55
Newark,N.J. W18 ... 5.00
Plymouth,Mich. P5 ... 4.80
Pittsburgh J5 ... 4.55
Putnam,Conn. W18 ... 5.10
Readville,Mass. C14 ... 5.10
St.Louis,Mo. M5 ... 4.95
So.Chicago,Ill. W14 ... 4.55
SpringCity,Pa.(5) K3 ... 5.00
Struthers,O. Y1 ... 4.55
Waukegan,Ill. A7 ... 4.55
Youngstown F3, Y1 ... 4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ... 5.40
BeaverFalls,Pa. M12 ... 5.40
Bethlehem,Pa., B2 ... 5.40
Buffalo B5 ... 5.40
Camden,N.J. P13 ... 5.80
Canton,O. R2 ... 5.40
Canton,O.(29) T7 ... 4.90
Carnegie,Pa. C12 ... 5.40
Chicago W18 ... 5.40
Cleveland A7 ... 5.45
Cleveland C20 ... 5.40
Detroit P17 ... 5.55
Donora,Pa. A7 ... 5.45
Elyria,O. W8 ... 5.40
Gary,Ind. R2 ... 5.40
Hammond,Ind. L2, M13 ... 5.40
Hartford,Conn. R2 ... 5.85
Harvey,Ill B5 ... 5.40
Lackawanna,N.Y. B2 ... 5.40
Mansfield,Mass. B5 ... 5.85
Massillon,O. R2,R8 ... 5.40
Midland,Pa. C18 ... 5.40
Monaca,Pa. S17 ... 5.40
Newark,N.J. W18 ... 5.75
Plymouth,Mich. P5 ... 5.60
So.Chicago,Ill. R2, W14 ... 5.40
Struthers,O. Y1 ... 5.40
Warren,O. C17 ... 5.40
Waukegan,Ill. A7 ... 5.45
Worcester Mass. A7 ... 5.75
Youngstown F3, Y1 ... 5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ... 4.75
ChicagoHts.(3,4) I-2 ... 4.50
Franklin Pa.(3,4) F5 ... 4.75
FortWorth,Tex.(26) T4 ... 4.85
Huntingtn,W.Va.(3) W7 ... 5.50
Marion,O.(3) P11 ... 4.75
Moline,Ill.(3) R2 ... 3.80
Tonawanda (3,4) B12 ... 4.75
Williamsport(3,4) S19 ... 5.00
Williamsport(4) S19 ... 5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 ... 15.00
Dover,(Eng.Bolt) U1 ... 13.50
Dover(Wrgt.Iron) U1 ... 12.25
Economy,Pa.(S.R.) B14 ... 9.60
Economy,Pa.(D.R.)B14 ... 11.90
Economy,(Staybolt)B14 ... 12.20
McK.Rks.(Staybolt) L5 ... 14.50
McK.Rks.(S.R.) L5 ... 9.60
McK.Rks.(D.R.) L5 ... 13.00

BARS ,Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ... 3.70
Alton,Ill.(6) L1 ... 3.70
Atlanta A11 ... 4.25
Buffalo R2 ... 3.70
Cleveland R2 ... 3.70
Emeryville,Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.20
Minnequa,Colo. C10 ... 4.15
Niles,Calif. P1 ... 5.05
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland,Oreg. O4 ... 4.65
Seattle B3, N14 ... 4.45
So.Chicago R2,U5,W14 ... 3.70
So.SanFran.,Cal. B3 ... 4.45
Sparrows Point,Md. B2 ... 3.70
Steubenville,O. W10 ... 3.70
Torrance,Calif. C11 ... 4.40
Warren,O. R2 ... 3.70
Weirton,W.Va. W6 ... 3.90
Youngstown R2, U5 ... 3.70

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ... 4.75
Dover,O. R1 ... 4.65
Ind.Harbor,Ind. I-2 ... 5.40
Mansfield,O. E6 ... 5.65
Niles,O. N12 ... 5.75
Torrance,Calif. C11 ... 5.40

SHEETS, H.R. (14-ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 ... 5.40
Conshohocken,Pa. A3 ... 5.65
Ecorse,Mich.G5 ... 5.95
Fairfield,Ala. T2 ... 5.40
Fontana,Calif. K1 ... 6.35
Gary,Ind. U5 ... 5.40
Ind.Harbor,Ind. I-2 ... 5.40
IndianaHarbor,Ind. Y1 ... 5.90
Irvin,Pa. U5 ... 5.40
Lackawanna(35) B2 ... 5.40
Pittsburgh J5 ... 5.40
Sharon,Pa. S3 ... 5.40
So.Chicago,Ill. U5 ... 5.40
SparrowsPoint(36) B2 ... 5.40
Warren,O. R2 ... 5.40
Weirton,W.Va. W6 ... 5.75
Youngstown U5 ... 5.40
Youngstown Y1 ... 5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 ... 6.55
Ecorse,Mich. G5 ... 7.10
Fontana,Calif. K1 ... 7.50
Gary,Ind. U5 ... 6.55
IndianaHarbor,Ind. Y1 ... 7.05
IndianaHarbor,Ind. I-2 ... 6.55
Irvin,Pa. U5 ... 6.55
Lackawanna(37) B2 ... 6.55
Pittsburgh J5 ... 6.55
SparrowsPoint(38) B2 ... 6.55
Warren,O. R2 ... 6.55
Weirton,W.Va. W6 ... 6.90
Youngstown Y1 ... 7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. 1-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala., R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. 1-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	5.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(29) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. Coated)

Gary,Ind. U5	5.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$8.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.90

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. 1-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,U5	5.60	5.85
IndianaHarbor 1-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFry,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.20

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. 1-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths 1/2c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower) Transformer Grade	72	65	58	52
BeechBottom,W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary, Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. 1-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Pickled

Bridgprt.Conn.(10) S15	5.45
Carnee,Pa. S8	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBrit.Conn.(10) S15	5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.30
Lackawanna,N.Y. B2	5.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	5.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill.(1) L1	3.75
Ashland,Ky.(8) A10	3.50
Atlanta,A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10)* S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2, J5	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt.Conn.(10)S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7		6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1		...	7.70	9.65	...
Carnegie,Pa. S18		6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBrit.Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. S5	5.20	6.80	7.40	9.35	11.65
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS; Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

STRIP, Hot-Rolled Carbon

NewBritn,Conn.(10)S15	10.75
Pawtucket,R.I.(11) NS	10.75
Pawtucket,R.I.(12) NS	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	6.55
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40)T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) NS	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Tool Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Ingo Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon, Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Alabama City R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston, Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet, Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.Calif. C11	6.65	6.80
Prtsmth.(18) P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1) N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.55
Cleveland A7	10.25	12.15
Crawfrdsville MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.55
Minnequa C10	10.40	12.40
Palmer,Mass.C12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE	(A)	(B)
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Flow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill.(1) L1	4.85
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet, Ill. A7	4.85
KansasCity, Mo. S5	5.45
Kokomo,Ind. C16	4.85
Los Angeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer, Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
Franklin Park,Ill. T6	6.20
Massillon,O. R5	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) NS	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. MS	8.85
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.35

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill.(1) L1	6.25
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So. Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
Los Angeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N. J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton, N.J. A7	6.20
Waukegan,Ill A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	136
Crawfordsville,Ind. MS	132
Donora,Pa. A7	150
Duluth,Minn. A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga. A7 B2	204
Johnstown,17ga.,4" B2	207
Joliet, Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	155
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth, Minn. A7	125
Franklin,Pa. F2	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	138
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	140
Crawfordsville,Ind. MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	144
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. MS	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. MS	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So. Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)

To dealers (33)!	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

NAILS & STAPLES, Stock

To dealers & mfrs. (1)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa. (13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M2	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.60
Ensley,Ala. T2	3.60	3.50	...	4.60
Fairfield,Ala T2	...	...	...	4.60
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.50	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna B2	3.60	3.50	...	4.60
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.230	20	4	1	6	12	3.535-3.675
Extra Carbon	0.270	19	4	2	7	...	2.460
Spec. Carbon	0.325	18	4	1	5	4	2.125
Oil Hardening	0.350	1	1	1	2	2	2.145-2.450
5% Cr Hot Wrk	0.350	1	5	1	3	...	1.60¼
Hi-Carbon-Cr	0.650	1	4	4	5	1	0.965
18W,4Cr,1V	1.505	18	4	1	5	1	1.190
18W,4Cr,2V	1.650	18	4	2	8	1	0.810

Tool steel producers include: A1, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Axles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga.& heavier.
(14) Also wide flange beams.
(15) 5/8" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven,Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15Ga.
(25) Rail mill hands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Rail mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

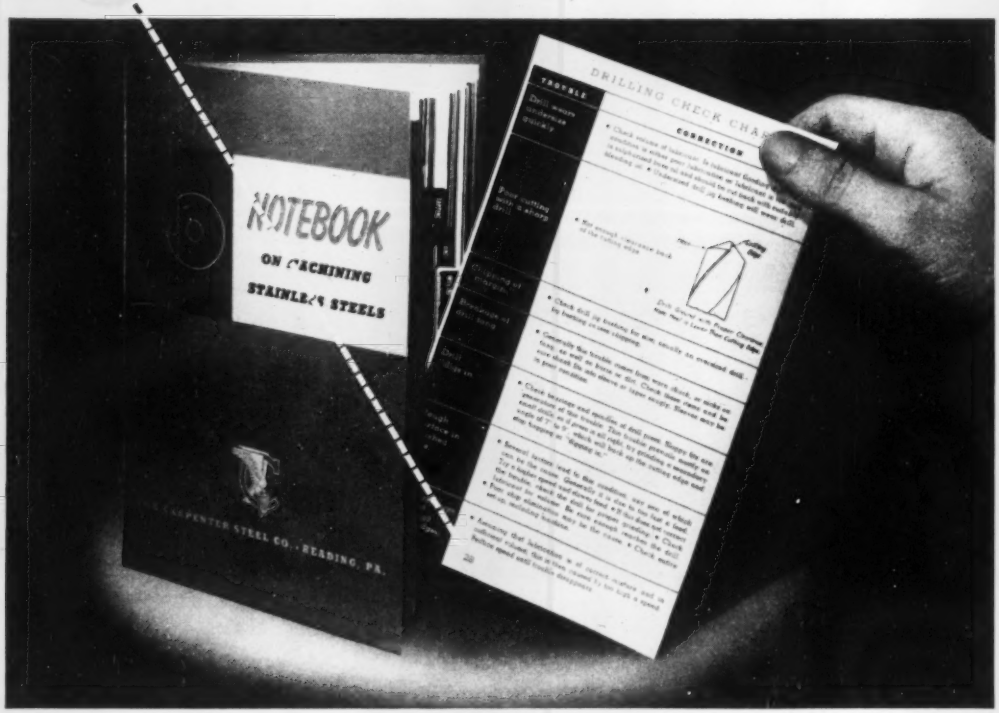
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield, S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad.& Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube



Where You'll Find Ways to DRILL Stainless FASTER

Perhaps your drilling problem isn't as difficult as one a customer recently called us about. The job was to drill a 5/16" hole through 2 1/4" of Stainless bar stock. By calling in his Carpenter representative, this production man selected just the right Stainless, and got shop help that made the job go faster with less scrap.

When you want to find the best combination of ways to get any Stainless drilling job done faster, put in a call to Carpenter. Tell the man who answers the phone that you would like help on a Stainless drilling job . . . or any other Stainless machining problem, for that matter. By working with Carpenter, you can often machine Stainless faster and reduce the number of scrap parts.

And by all means, if you don't have a copy of Carpenter's "Notebook on Machining Stainless Steels", ask for one. Just write us a note on your company letterhead.

Shop notes on DRILLING stainless to help your men improve results and conserve stainless steel

WHEN DRILL "DIGS IN" . . . Check bearings and spindles of drill press. Sloppy fits are generators of this trouble. This trouble prevails mostly on small drills, so if press is all right, try grinding a secondary angle of 7° to 9°, which will back up the cutting edge and stop hogging or "digging in".

CURE FOR ROUGH SURFACE IN FINISHED HOLE . . . . . Generally due to too fast a feed. Try a higher speed and slower feed. If this does not correct the trouble, check the drill for proper grinding. Check lubricant for volume. Be sure enough reaches the drill. Poor chip elimination may be the cause. Check entire set-up, including machine.

For more information on Drilling, use Carpenter's "Notebook on Machining Stainless Steels"

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.
Export Department: Carpenter Steel Co., Reading, Pa. "CARSTEELCO"

Carpenter

STAINLESS STEEL

takes the problems out of production

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5c	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.13	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 3½ points lower on ⅛". 1½ points lower on ¼", and 2 points lower on ⅜". W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ⅛" and ¼". Fielding, mike, ½" and larger; Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill. (Gary base) L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛". 1 point lower on ½", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2" 2½" and 3". Following quote only on ½" and larger; Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4". Youngstown Y1; Aliquippa, Pa. J5 quotes 1 point lower on ½", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Galv. B	Elec. Weld Black C	Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-3½ in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2¾	12	29.65	36.32	29.57	34.76
3	12	32.11	39.33	31.33	36.84
3	12	34.09	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10%	Both Sides	—Sheets— Carbon Base 10%	20%	Cu Base Both Sides
302				19.75	26.24- 27.50	77.00	
304	25.00	29.50		24.50	27.50- 27.77	77.00	
309	30.50	35.00					141.00
310	36.50	41.00					
316	29.50	34.00		26.00	35.92- 36.50		
317	34.50	38.00					
318	33.50	38.00					
321	26.50	31.00 32.00		23.00	33.00	111.00	
347	27.50	32.00		24.00	33.50- 33.83	130.00	
405	21.25	27.75					
410	20.75	27.25					
Nickel	33.55	45.15	41.00	54.00			
Inconel	41.25	54.18					165.00
Monel	34.93	46.28					
Copper*			23.70	29.65			

* Deoxidized. 20.20c for hot-rolled; 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-1; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ⅞-in.	18.5
1-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Heavy
½-in. & smaller	15	15
⅝-in. & ⅞-in.	12	6.5
1-in.-1⅛-in.	9	1
1¼-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	16.5	6.5
1-in.-1⅛-in.	12	2
1¼-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	23	17.5
1-in. & 1⅛-in.	19.5	12
1¼-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅞-in.	29.5	22
1-in.-1⅛-in.	24	15
1¼-in. & larger	13	8.5
		Light
½-in. & smaller		35
⅝-in. to ⅞-in.		28.5
1-in. to 1⅛-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers. List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Diam. Inches	Length	Cents per lb
17.18-20	60-72	17.85
8 to 16	48-60,72	17.85
7	48-60	19.57
6	48-60	20.95
	CARBON	
35, 40	100-110	8.03
30	84-110	8.03
24	72 to 104	8.03
17 to 20	34-90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	50.00	44.75
310	57.00	50.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	42.00	31.25
430	39.00	31.00	28.25
501	24.00	20.00	14.25
502	28.50	27.00	15.25

Baltimore, Types 301 through 316 sheet, except 303 and 309 S2.

Brackenridge, Pa., sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347, 0.40c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00 on Type 301, 36.50 on 302, 38.50 on 304, 58.50 on 316, 52.00 on 347, 30.50 on 410, and 31.00 on 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all products, R2.

McKeesport, Pa., strip, Type 410, bars & wire, Types 410 through 430 and 31.25c on Type 502, 33.25c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 316, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c for Type 301 and 56.00c for Type 309, bars, except 31.50c for Type 301 and 45.25c for Type 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303 & 309, 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg. 26.00-33.00

Industrial xylol .. 25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) .. 17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron	
98+% Fe, carlots	16.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl iron:	
97.9-99.8%, size 5 to 10 microns	$3.00-$48.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	34.25-60.00
Phosphor-Copper, 10 tons	59.00
Copper:	
Electrolytic	43.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	83.00
Nickel-Silver, 10-ton lots	44.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
99%, minus 80 to 200 mesh, freight allowed:	
1000 lb and over	4.00
Less than 1000 lb	4.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
less than 1000 lb	4.25
Molybdenum:	
99%, minus 80 to 200 mesh,	
over 500 lb	2.85
200 to 500 lb	3.10
less than 200 lb	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

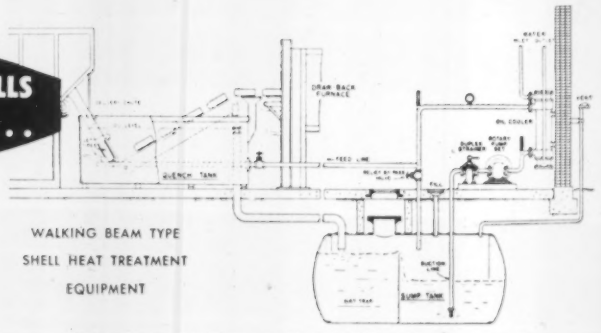
Connellsvll.fur.	$14.50-15.00
Connellsvll.fdry.	17.00-18.00
New River, foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.40
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.28
Cincinnati, del.	25.73
Detroit, del.	26.74
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.75
Erie, Pa., ovens	25.50
Birmingham, ovens	20.30
Birmingham, del.	21.68
Philadelphia, ovens	22.70
Nevillefsland,Pa.,ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., oven	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.75
Flint, del.	26.48
Pontiac, del.	25.42
Saginaw, del.	26.81

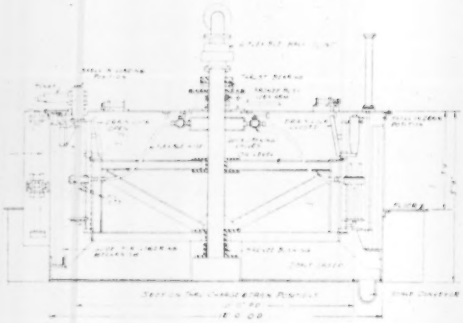
* Or within $4.15 freight zone from works.

WHEN HEAT TREATING SHELLS BY THIS METHOD . . .



WALKING BEAM TYPE
SHELL HEAT TREATMENT
EQUIPMENT

OR BY THIS METHOD . . .



ROTARY TYPE
SHELL HEAT TREATMENT
EQUIPMENT

You get a faster, surer quench with proven HOUGHTO-QUENCH OIL

Selecting the proper quench is a critical step in making shells. Whatever type of steel is used — whichever quenching equipment is adopted — the right quenching oil has a lot to do with getting top results. Performance of Houghto-Quench on millions of shells in World War II proved this.

Shell manufacturers — and other heat treaters — are now finding modern, fortified Houghto-Quench again the fastest, surest quench. This stable oil was developed only for quenching. It absorbs heat faster. It maintains uniform quenching speed regardless of bath temperature. It enables you to meet the high physicals required.

To obtain maximum hardness — even with today's low alloy steels — use Houghto-Quench in your plant. For prompt information and prices write E. F. Houghton & Co., Philadelphia 33, Pa.

Ask the Houghton Man for help with any heat treating problem. If he doesn't know the answer on the spot—he'll get it!

HOUGHTO-QUENCH
. . . a product of

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.50	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.87	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.05	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90§	5.70	...	5.70	7.55	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75§	5.55	...	5.55	7.55	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05§	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85§	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80§	8.90§	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60§	9.20§	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; 2—500 to 1499 lb; 3—450 to 1499 lb; 4—5000 lb and over; 5—1000 to 1999 lb.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports. After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematities	15.75
Brazilian iron ore, 68-69%	18.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Indian manganese, 46-48% nearby, 92.00-96.00c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%.) Contract, carload, lump, bulk, max. 0.03% C 35.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.3c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%.) Contract, c.l. x M x D, bulk 23.25c per lb of contained Cr, C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, S M x D, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum, 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.8c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 161, Aug. 6 issue; manganese, titanium and "other" ferroalloys, page 147, Aug. 6. Refractories prices were published on page 161, Aug. 6.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.3c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max., C 3-3.5% max.). Contract any quality, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3.20. **Primary and High Speed Grades** (V 35-55%, Si 1.50% max., C 0.20% max.), $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 78, 56c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.) Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (16-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%), Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%.) 10,000 lb W or more, $5.00 per lb of contained W 2000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min.) 1000 lb or more, $6.00 per lb of contained W; less than 1000 lb W, $6.15.

*Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

Aug. 16	$44.00
Aug. 9	44.00
July 1951	44.00
Aug. 1950	40.00
Aug. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Bushelling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Bushelling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	+ 2.00
21. 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles and locs. axles with keyways between the wheelseats	Base
5. No. 1 Bushelling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Cagsides, Doors, Car Ends, cut apart	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.
(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
(4) For preparing into Grade No. 25, $6.
(5) For preparing into Grade No. 19, $6.
(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) For preparing into Grade No. 17 or Grade No. 21, $11.
(8) For preparing into Grade No. 18 or Grade No. 20, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
(3) For preparing into Grade No. 16, $4.
(4) For preparing into Grade No. 17, $5.
(5) For preparing into Grade No. 18, $7.
(6) For preparing into Grade No. 21, $4.
(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commissions shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 54c; Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.

Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 63c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.

Coatesville, Pa., 59c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, Tex., 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, W. Va., 70c.

Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Bushelling	29.50
Bushelings new factory, prep'd.	33.00
Bushelings new factory, unprep'd	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.

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LEBANON, PENNA. — Luria Building
PUEBLO, COLORADO — 334 Colorado Bldg.
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The Metal Market

Expansion of aluminum production facilities assures consumer goods producers of ample supplies as soon as defense needs taper. Alcoa expected to build plant in Texas

AMPLE supplies of aluminum will be available to cover your needs as soon as the present spurt in defense requirements are satisfied. The industry is expanding rapidly and most of the new capacity is planned on an economical basis which will justify their continuance following the emergency. This is in direct contrast to the experience in World War II when several plants were erected by the government and subsequently closed due to high production costs.

Texas Plant—Interior Department has recommended that certificates of necessity be issued to the Aluminum Co. of America for construction in Milam county, Texas, of new production facilities having a capacity of 85,000 tons per year, together with facilities for the annual production of 180,000 tons of aluminum.

Of the 638,000 tons of additional aluminum production capacity, certified as necessary for national defense, 514,000 tons have been previously allocated or recommended for allocation.

Under the original 450,000-ton aluminum expansion program, facilities for 320,000 tons are now under construction, including: 120,000 tons by Alcoa, 100,000 tons by Reynolds Metals Co., and 100,000 tons by Kaiser Aluminum & Chemical Corp. This left a balance of 130,000 tons, which was raised to 318,000 tons when the expansion program was revised last May.

To meet this need, Kaiser will construct a 100,000 ton plant at Chalmecte, La., and one of 20,000-ton capacity at Longview, Wash. A government loan of $46 million to Harvey Machine Co. has been recommended for construction of a 54,000 ton plant at Kalispell, Mont., with an alumina plant near Everett, Wash. Negotiations are still active with several other new companies for the balance of the program.

Production of primary aluminum in this country during the first half of 1951 reached the highest level since the first half of 1944 and exceeded the level for the first half of last year by 18 per cent. The second quarter total was 202,875 tons, including 67,454 tons in June, compared with 200,716 tons in the first quarter, making the first six months' total 403,591 tons.

Tin Market Firms Abroad

Tin consumption in the first quarter of 1951 was 13.5 per cent higher than in the like 1950 period. The major increases were in bronze, solder, babbitt, products which are essential in the production of durable goods for civilian and military uses.

Tin stocks fell by 4650 tons during the quarter. Almost the entire decline occurred in stocks of primary tin, indicating the inability of imports at the first quarter rate to fulfill both consumption and stockpile needs, reports the Tin, Lead and Zinc Division, National Production Authority.

Straits tin held unchanged at $1.03 a pound through mid-August, despite a stronger market in London.

Negotiations between government officials and Bolivian tin producers are still in progress on a new purchase agreement. Bolivia is reluctant to accept the RFC's tentative offer of $1.12 a pound pending completion of a study being made in the South American country. At the conclusion of the study, RFC will set a final price based on costs and other factors affecting the Bolivian tin producers.

Zinc Shipments Increase

Shipments of slab zinc increased in July to 83,346 tons from 79,299 tons in June. The increase to the highest total recorded in a year was at the expense of stocks which dropped to 11,400 tons from 15,791 at the end of June. Members of the trade are critical of the government for its continued withdrawal of zinc, amounting to 3865 tons in July, for stockpiling purposes. Included in last month's shipments were also 3020 tons on export and drawback account. A reduction in export and stockpiling tonnages, traders contend, would alleviate the shortage of metal available to domestic consumers. Their requests for August delivery were about double the estimated supply.

Producers have been unable to increase output appreciably, due primarily to the lag in imports. Daily average production in the first seven months of this year was 2577 tons compared with 2194 tons in 1950 and 2663 tons in 1943, the all-time high. Smelters are cautious in booking forward orders, their backlogs having dropped to 62,412 tons at the end of July from 73,304 at the end of June, and 80,769 tons at the end of March, the high for recent years.

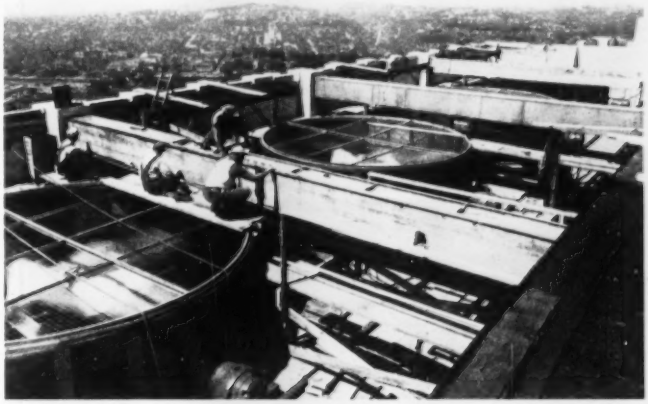
Water Shortage Forecast

At a conference in Tacoma, Wash., of public and private power producers and industrial users of electricity, plans were discussed for dealing with an anticipated power shortage next winter, due to this summer's heavy snow melt and lack of rain. Distributors are preparing to report plans for potential service curtailment, industrial customers to be rated on the basis of the number of employees affected.

In the event power cuts are necessary, 300,000 kilowatts of interruptible power, supplied principally to the aluminum industry, presumably would be the first affected. Bonneville Power Administration reports that in the fiscal year ended June 30, the aluminum industry bought over 6½ billion kilowatt hours.

Mercury Demand Tapers

Demand for mercury continues light with consumers drawing on inventories to cover most of their current needs. Price tone is weak with large lots offered at $198 per 76-pound flask. Smaller lots are quoted $200 to $202 per flask. Spanish mercury is offered at $225, delivered in New York, including import duty.



COOL, COOL WATER: Brass bolts and copper nails are used to fasten this 97-foot long redwood cooling tower atop Pittsburgh's newest and largest skyscraper. Four huge stainless steel fans powered by 30-horsepower motors blow air on the condenser water, dropping its temperature about 10 degrees. The system handles 7650 gallons of water per minute and contains some 16 miles of copper pipe and tubing

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 34.00c; No. 1 yellow (No. 405) 25.50c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb. c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York $195-$202 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $89-93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; effective May 23, 1951)

Sheet: Copper 40.18; yellow brass 37.28; commercial bronze, 95% 40.18, 90% 39.78; red brass, 85% 38.96, 80% 38.47; best quality, 38.07; nickel silver, 18%, 50.99; phosphor-bronze grade A, 5%, 59.42.

Rod: Copper, hot-rolled 36.03; cold-drawn 37.28; yellow brass free cutting, 31.70; commercial bronze, 95% 39.87, 90% 39.47; red brass 85% 38.55, 80% 38.16.

Seamless Tubing: Copper 43.22; yellow brass 40.29; commercial bronze, 90% 42.44; red brass, 85% 41.77.

Wire: Yellow brass 37.57; commercial bronze, 95% 40.47, 90% 40.07; red brass 85% 39.15, 80% 38.76; best quality brass, 38.36a.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 30.10, l.c.l. 30.18; 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, Inches	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	....	....
0.135-0.096	12-48	30.6	....	....
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	——Hexagonal——	17S-T4
0.125	52.0	....		....
0.156-0.188	44.0	....		....
0.219-0.313	41.5	....		....
0.375	40.0	46.0		48.0
0.406	40.0	....		....
0.438	40.0	46.0		48.0
0.469	40.0	....		....
0.500	40.0	46.0		48.0
0.531	40.0	....		....
0.563	40.0	....		45.0
0.594	40.0	....		....
0.625	40.0	43.5		45.0
0.688	40.0	....		45.0
0.750-1.000	39.0	41.0		42.5
1.063	39.0	....		41.0
1.125-1.500	37.5	39.5		41.0
1.563	37.0	....		....
1.625	36.5	....		39.5
1.688-2.000	36.5	....		....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl, 33.00c; up to 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.69c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, A	27.00	26.75	25.75

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 85 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50; engravers' and lithographers' plates, 14.50c; die cast slabs, min. 90% zinc, 12.25; old zinc scrap, 11.25c; forming and stamping dies, 11.25; new die cast scrap, 10.75; old zinc die cast radiator grills, 10.50; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more, less 2.25c in lots less than 15,000 lb. Used storage batteries (in boxes): drained of liquid, 6.60c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50, high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

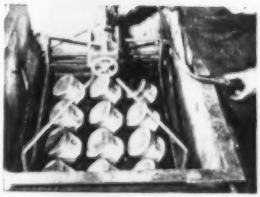
DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Aug. 1-16	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July 2-31	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 28-30	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 18-27	24.50	16.80	17.50	106.00	19.00	42.00	56.50	87.75
June 15-16	24.50	16.80	17.50	111.00	19.00	42.00	56.50	87.75
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.462
May Avg.	24.50	16.80	17.50	138.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16
Feb. Avg.	24.50	16.80	17.50	182.716	19.00	42.00	50.50	90.16
Jan. Avg.	24.50	16.80	17.50	171.798	19.00	33.462	50.50	88.890

NOTE: Copper; Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IN "PRODUCTION-LINE" CLEANING

Vapor Degreasing CAN SAVE YOU TIME . . . SPEED YOUR OUTPUT

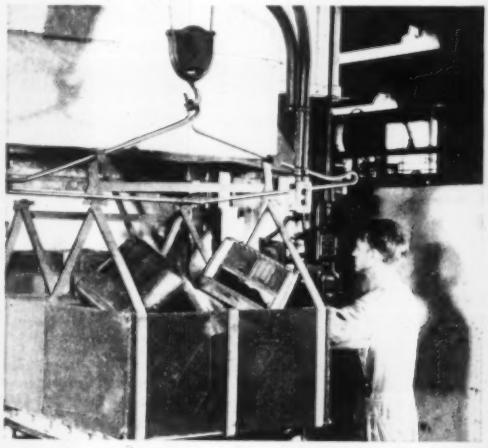


AFTER MACHINING . . .

Cutting oils and buffing compounds are quickly removed from these aluminum aircraft engine pistons. Manually operated degreaser handles precision parts without risk of damage inherent in mechanical cleaning methods.

OR BEFORE PAINTING . . .

Thorough, rapid cleaning of stamped business-machine housings is just one of this conveyorized degreaser's jobs. It handles a wide range of work at various steps in manufacture.



Less than a minute! That's how fast oil and grease are often cleaned from metal when vapor degreasing with Du Pont Trichlorethylene. Vapor degreasing reaches inaccessible places, leaves parts clean and dry, ready for the next step. It saves time often wasted in slower, costly hand and mechanical cleaning.

Vapor degreasing can clean parts of any size, any shape, any metal. And a wide variety of highly efficient equipment is available. Units can be easily installed at any step in your production line. A single unit can often handle an entire plant's degreasing work.

Thousands of manufacturers are now using this fast, safe, efficient method of metal cleaning. It's especially applicable for plants expanding production or doing metal cleaning for the first time. Get the facts today by sending the coupon below.

Du Pont Degreasing Solvents have been widely used for many years and are available under various trade marks, such as "Triclene" D.

These solvents are stable . . . stand up against contaminating and destructive materials . . . are the best yet developed by Du Pont for metal degreasing.

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Name _____ *Position* _____

Firm _____

Street and No. _____

City _____ *State* _____

Tubular Goods . . .

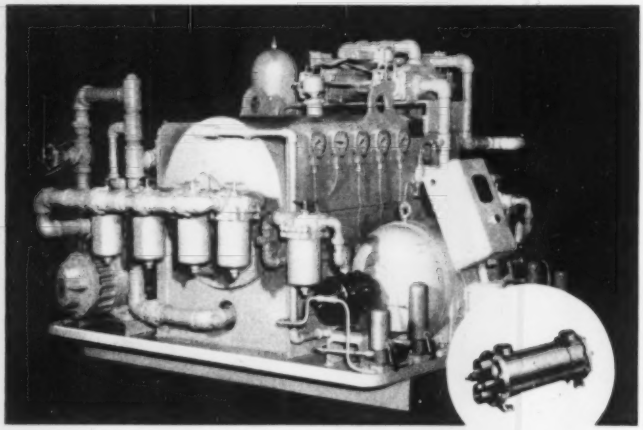
Tubular Goods Prices, Page 129

Pittsburgh — Manufacturers Light & Heat Co., is using European pipe for gas service improvement projects, including well drilling. The company said it has been forced to tap supplies of Belgium and Germany.

More than 30,000 feet of 10¾-in. steel pipe was unloaded into barges in the lower Mississippi river and towed to Baden, Pa. Rail shipment then was made to the company's pipe yard at Washington, Pa., 30 miles from Pittsburgh. An additional 21,000 feet of similar pipe was shipped by rail from Baltimore to the same destination.

Manufacturers Light said it has on order 230 metric tons of 4½-in. steel pipe from a German pipe mill. It anticipates receiving about 200,000 feet of 6⅝-in. steel pipe from Dusseldorf. About 250 metric tons of 10¾-in. domestic steel well casing is being purchased for drilling purposes. It is enroute to gas company shops and pipe yards in Pennsylvania and West Virginia.

Boston—Pressure is off somewhat for merchant steel pipe although consumers and distributors are taking fourth quarter allotments in full. On 10-in. and under seamless, mills are booked into February and, on tubing specialties, beyond. Some unrated pipe orders, mostly buttweld, are being shipped. Distributors are selling well ahead on seamless allotments. The Connecticut producer is increasing capacity for small electric welded specialties.



By Complete Fluid Power Package, Seco means Ross Exchangers, too!

Built to individual specifications for automatic high-low hydraulic press operation, Seco Fluid Power Packages, like the one shown, are designed for generating pressures up to 10,000 psi.

In describing its product as "A compact, complete power and control unit ready to connect to your hydraulic press", Simplex Engineering Company, the manufacturer, *means* "complete" in the true sense of the word. Both pumps, for high and low pressure circuits, have built-in protection from a Ross Type BCF Exchanger, the fully standardized all-copper and copper alloy unit that spells S-A-F-E-G-U-A-R-D against excessive oil temperature. Without this protection, hydraulic oil could well lose its essential characteristics, resulting in lost pump capacity through slippage.

Says Simplex Engineering Company: "We are using Ross Exchangers exclusively and find them highly satisfactory . . . have yet to receive the first complaint."

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If you use fluid power for the machines you make or the machines you buy, Ross Broadside 1.1K4 holds some interesting facts for your design and plant engineers. Write Ross Heater & Mfg. Co., Inc., Division of American Radiator & Standard Sanitary Corp., 1451 West Ave., Buffalo 13, N. Y. In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

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Sheets, Strip . . .

Sheet and Strip Prices, Page 125 & 126

Cleveland — Confusion in the sheet steel market is unprecedented. Overallotment of tonnage on CMP tickets against mill set-asides will result in heavy third-quarter carryover of unfilled orders into fourth quarter. On top of this the mills already are overbooked against their fourth quarter set-asides, no increase in the latter having been announced despite the intention of NPA to close up the open-end of the Controlled Materials Plan Oct. 1. Actually, complete closing of CMP probably will not be effected before first quarter of next year. At any rate, as things now stand, there still will be a so-called "free supply area" after Oct. 1 since it is recognized all consumers will not have been able to obtain allotment tickets by that date. Some trade authorities think a "free area" will prevail into November. In such event actual closing of the open-end of CMP for all practical purposes will not come before year end since the deadline for mill lead-time on orders for first quarter of next year comes at mid-November.

Philadelphia—Sheet sellers are already well booked up to the limits of their set-asides on rated work and in some instances well beyond. Substantial arrearages are adding to the stringency in many cases. Producers of galvanized sheets with rated quotas of 80 per cent appear to be sold out completely on all fourth quarter capacity, as a partial result of arrearages. The proposed switch over to 100 per cent CMP should have little effect on certain grades.

Boston — Only in isolated cases are consumers of flat-rolled easing demand against fourth quarter allotments. Many, however, earlier bought heavily with orders for finished products declining. Production is down and steel inventories are approaching the limit under controls in some instances. One range builder placed no orders against fourth quarter allotments.

Pittsburgh—Automotive and consumer goods cutbacks by NPA have not eased sheet demands. Increased defense effort take has offset any slackening. Large third quarter carryover including validated orders is expected. This situation may not become as severe as presently believed since cancellations and reductions may come as purchasers get supplies from other producers. It is believed over-estimation of needs and dual-placing of validated orders exists. DPA officials are checking this possibility.

Cincinnati — Sheet mills await changes in CMP before definite gaging of the supply situation for remainder of the year. The pinch for consumer wares is certain to be severe. Heavy carryovers cannot be avoided.

Chicago—September threatens to be a rough month for many sheet users particularly those who were unable to place all or only portions of their

CMP certified requirements with mills because the latter were booked to the limit of set-asides.

Birmingham—Observers see no chance for any easing in flat-rolled products because of exceptionally heavy bookings and the fact output is practically 100 per cent under directive. Advent of the cotton baling season has resulted in some pickup in production of strip.

Los Angeles — Producers, snowed under with CMP validations on first-come, first-served basis, face bitter, frustrated long-time customers. Inability to obtain sufficient flat-rolled tonnage drives many fabricators to the brink of 2-3 month shutdown—or into the gray market for stop-gap supplies.

Steel Bars . . .

Bar Prices, Page 125

New York—Various hot carbon bar consumers rounded out their applications for fourth quarter rated tonnage by Aug. 15, but are fearful they will not be able to find a schedule for much of the tonnage they recently applied for. In fact, many of their orders are now being returned on the basis of present mill set-asides for rated work. Eventually the volume of setasides will probably be increased to 100 per cent in line with Washington's program for bringing all requirements under CMP, as of Nov. 1 now instead of Oct. 1. But just definitely when this increase will be made official remains to be seen. Currently, despite word that all requirements are to be brought under CMP by Nov. 1, producers are still adhering to the present schedule of set-asides and as a result are turning back no little rated work. In some sizes of hot bars mills are booked into the early part of next year. This is in cases where producers have not been able to schedule the work for the fourth quarter and consumers have re-certified their orders within the seven day period allowed by Washington.

Boston — Some free tonnage cancellations are indicated by the ruling holding consumers to CMP limits for specified production programs. Meanwhile, some cold drawn and alloy inquiry is appearing for first quarter. Inventories are heavier with most consumers, and new buying pressure is easing somewhat.

Philadelphia—While CMP is scheduled to go on a 100 per cent basis, apparently Nov. 1 now instead of Oct. 1, there has been no official word changing the percentage of mill set-asides. Hence, hot carbon bar mills are still guided in the acceptance of new tonnage for fourth quarter by the 78 per cent of set-asides, plus shell steel directives. Both buyers and sellers are awaiting clarification of the whole situation so that they will at least know where they stand.

Pittsburgh—Bar producers report fourth quarter booked solidly with greater tonnage validated than producing potential warrants. This condition is prevalent in all products. Cold-finished bar producers may have greater difficulty obtaining hot bars than expected. Alloy producers face stringent raw material situation akin to that of early summer. Demand centers on up to 5-in. sizes but larger stock capacity is fully booked also. Scheduling difficulties will arise despite early complete booking for fourth quarter.

Cleveland—Booked-up condition of barmakers precludes acceptance of any substantial additional tonnage for fourth quarter. Mills already are committed far beyond their set-asides. NPA a week or so ago announced the open-end of the Controlled Materials Plan would be closed Oct. 1. However, mill set-asides were not increased accordingly to 100 per cent. Actually, it would appear CMP can't be closed up before November, possibly later. In event it is November, for all practical purposes this would mean CMP will be open-ended through the remainder of the year in some degree, since mill-order lead time for first quarter of next year falls at mid-November.

Chicago—Many users of bars will be hamstrung in their operations during next two months because of their inability to find mill accommodations for their CMP certified allotments. Deficiencies fall hardest in forging grade bars and cold-finished items.

St. Louis—Merchant bars available to free market consumers are scarce. This district contains many bar-using manufacturers who are not covered. Merchant bars are sold out for the fourth quarter.

Plates . . .

Plate Prices, Page 125

Philadelphia — With plate mills booked up solidly on rated work for fourth quarter, B class consumers who had until Aug. 15 to apply to CMP for allocation tickets, are wondering just where the plate tonnage that they hadn't already been able to previously certify is coming from. Originally they were permitted to specify for fourth quarter up to 70 per cent what they were scheduled to get in the third quarter and practically all have long since done so. But as to what they will get now in addition to that remains to be seen. Cutbacks and a general rescreening of requirements appear to be the only answer, and how soon that can be done is difficult to say. Certainly, if the 45-day lead time were to be observed nothing could be done for October. Most trade sources believe it will take Washington at least two weeks after the Aug. 15 deadline to weigh the situation.

New York—Plate mills are having to return various orders for tonnage even though certified under CMP. Including directives, plate producers generally, have set-asides amounting to around 95 per cent of production and in addition have carryovers which virtually place them out of the market for fourth quarter, with the result that they cannot accept much rated work now being offered. Such important consumers as car builders and pressure vessel manufacturers are having their orders returned because of the sold up condition of the mills. There is strong opinion in the trade that adjustments in the present scheduling of the mills for fourth quarter will have to be made, with a re-screening somewhere along the line of mill orders now scheduled, if some large consuming plants are to avoid closing down, or at least seriously curtailing before end of the year.

Boston—Demand for plates holds at top levels, but shop inventories are building up slightly with a few fabricators. New orders for fabricated structures are less active, notably civilian, although backlogs for tanks and weldments are substantial in most cases. Shipbuilding needs are heavier. In general, new defense volume hardly balances the slackening in civilian bookings.

Cleveland—Plate sellers in this area are unable to accept more rated tonnage for fourth quarter and a number of requests have been turned back. Closing of the open-end of CMP will necessitate some changes in mill schedules for fourth quarter. However, it will be October, possibly November before CMP actually is closed. Mill set-asides now run to about 95 per cent of output so that even if the set-aside is increased not much additional tonnage remains to be rated. Indications are newly rated CMP ticketholders will be held to the limits of the "free" area supply now open to them.

Pittsburgh—Fourth quarter books of most plate makers here are filled. More validated tonnage than potential supply will create confusion through the closing months of the year with carryover containing certified orders. Demand runs strongly for light plate with heavy plates not far behind.

Birmingham—The district's biggest plate producer is booked through the year. Producers have been forced to turn down some rated tonnage.

Los Angeles—Platemakers' books are filled through fourth quarter with directive tonnage, CMP validated tonnage carried over from September, with fourth quarter percentage tonnage of third quarter CMP certifications, and with a few fourth quarter CMP validations already presented.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 125

St. Louis—Reinforcing barmakers are sold so far ahead there is little hope the August-September major construction ban will even allow them to get current. One producer estimates it will take eight months to work off present bookings. Dearth of old rails has cut back production. For this reason June and July output was 70 per cent of capacity.

Los Angeles—Heavier defense construction needs cause producers to fall 30-60 days behind on deliveries of reinforcing bars. Valuation of military and naval construction in southern California, southern Nevada, and Arizona in July was $42.5 million, 56 per cent higher than in June.

Tin Plate . . .

Tin Plate Prices, Page 126

San Francisco—California packers expect to put up 31,031,126 cases of canned peaches, apricots, pears and fruit cocktail this year, 85 per cent of the nation's pack of these items. Asparagus, spinach and tomatoes canned in California will account for approximately 30 per cent of the national output.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 129

Chicago—Comparative easiness in foundry coke during past two months is expected to disappear soon after Labor Day. Consumption has been reduced during vacation shutdowns but inventory building is uncommon because storage facilities do not permit.

Structural Shapes . . .

Structural Shape Prices, Page 125

Philadelphia—Fabricators are much concerned about fourth quarter steel. They have had so much tonnage deferred that by the time they have been able to get around to rerating for fourth quarter, the mills have had relatively little tonnage left. Some fabricators estimate their industry will get less than 10 per cent of the shapes available in that period, and predict that unless there is some drastic change in the present set up, there will be widespread curtailment in shop operations. Also, lag in getting projects processed by Washington, with resultant uncertainty as to when work can be undertaken and what the situation will be at the time with respect to material deliveries and costs, is holding back demand. Current inquiry is spotty, and at the moment comprised mostly of bridgework. Orders are light in the aggregate. Hence, backlogs of fabricating shops are declining. However, fabricators have considerable work scheduled ahead.

Boston—Some fourth quarter structural volume will be displaced due to late revalidation. Also part of the period's tonnage will be required to fill third quarter carryovers. Allotments for highway bridges are slow. But most industrial expansion projects are on better schedule. Potential needs for remainder of the year are in excess of structural mill capacity. Smooth going under CMP is complicated by longer procurement factors involved for structural steel from design board to erection. District shops have substantial contracts for conveyor work in some cases. Newly bid bridge contracts involve 6000 tons, but inquiry is slower.

Pittsburgh—Structural steel fabricators hold substantial order backlogs but present short supply of shapes prevents construction. Fabricators are reluctant to accept new orders when some rated jobs are idle due to steel shortage. Industrial construction has been slowed somewhat for this reason. Producers report overvalidation and expected fourth quarter confusion in scheduling because of large validated carryover.

Cleveland—Indications are structural supply will fall considerably short of requirements for months into the future. All of the mills will enter fourth quarter with third quarter carryover and this means the squeeze in the closing months of the year will be just that much greater. With all construction projects under mandatory controls beginning fourth quarter steel procurement becomes more snarled in government red tape. New NPA regulations are more detailed, aimed at conserving controlled materials. Future starts require authorization and CMP allotments.

Chicago—Because of the dearth of structural steel during the next four months numerous construction projects may have to be abandoned or delayed. This applies to city, county and state bridges and highway jobs.

Los Angeles—Valuation of public works projects in southern California in July spurted to $65,081,924, 34 per cent higher than in June.

San Francisco—Steel fabricating plants in the Bay Area have resumed operations after a 12-day tie-up caused by a strike of about 1300 iron workers over the effective date of a new contract. The local of the AFL International Association of Bridge, Structural & Ornamental Iron Workers received a 14 cent per hour pay boost retroactive to July 1, and greater vacation benefits.

Wire . . .

Wire Prices, Page 127

Boston—Orders for finished products fabricated from wire are slower, but steel demand is holding with few exceptions. Screw volume is off, reflecting slower automotive and appliance demand. Aircraft buying is below expectations and finished wire inventories with most users are heavier and better balanced. Buying of bedding and upholstery spring wire for fourth quarter is slow.

Birmingham—Distributors are doling out meager wire product supplies mostly on the basis of making available tonnage go as far as possible among regular customers.

Iron Ore . . .

Iron Ore Prices, Page 131

Cleveland—Shipments of Lake Superior iron ore increased to 3,175,939 tons in the week ended Aug. 13 from 2,875,814 tons for the preceding week and 2,840,182 tons for the like week a year ago, reports the Lake Superior Iron Ore Association. The average daily loading total from United States ports increased to 440,336 tons from 401,861 tons for the week ended Aug. 6.

This brought the season's cumulative total to 51,024,429 tons, an increase of 11,818,969 tons over the total for the like 1950 period. The increase for United States ports is 11,537,540 tons.

Based on present activity in the ore

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shipping trade and barring an early closing of the season, the lake fleet should exceed its 1950 total of 78,205,592 tons by about 13 million tons. Shipment of something over 91 million tons for the season would assure furnaces adequate supplies for the winter.

Pig Iron . . .

Pig Iron Prices, Page 124

Cleveland—Merchant pig iron suppliers anticipate rising demand pressure from the foundries as increasing casting capacity is diverted to production on defense and related account. Currently, increase in machine tool castings work is being encountered offsetting in some degree slackening experienced in demand for castings on general account. Tight situation as regards pig iron supply promises to continue indefinitely, but, so far as can be learned merchant iron sellers are doling out tonnage in such fashion few foundries to date have been seriously hampered by lack of supply. However, they are unable to build inventories and this is cause for considerable concern in view of the rising pressure of defense needs. All blast furnaces in this district are operating at capacity. One stack producing for the merchant market, however, is scheduled to be taken out of production next month for extensive repairs. While customers were advised of this projected action months ago the heavy demand for iron has prevented accumulation of stocks against the shutoff of this supply source. Consequently, the normal demand burden of this idled stack will be piled on other furnaces.

Boston—Most customers of the Mystic furnace favor five year extension of the mutual agreement contract sought by the producer recently. Buyers agree they have been well covered under present supply conditions by the Everett stack. Foundry melt is unchanged with hardly 40 per cent defense-supporting. Basic melters are operating at high rate with small inventories.

New York—Demand for pig iron is increasing, due to the fact that most district foundries have completed vacation periods and to a heavier demand for castings. Contributing to stronger casting inquiry is a stepping up in requirements from machine tool builders. However, pig iron supply continues short as ever, with consumers having to rely more on scrap for whatever increase in melt they can achieve.

Buffalo—Automotive and building equipment casters are vieing with shops turning out government orders for supplies of merchant pig iron. Government work gets preference, but substantial tonnages continue to go to the other consumers. Market is unchanged with vacations and heat wave having some effect. Production holds at 100 per cent.

Philadelphia—With certain of the larger consuming plants closed for vacations, pressure for foundry iron is still off a bit although demand exceeds supply. Sellers anticipate greater pressure after Labor Day. Meanwhile demand for coke is fairly easy, with most consumers having filled their bins. There probably will be

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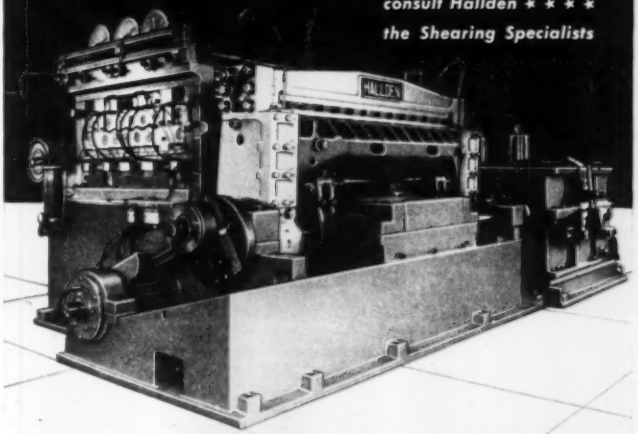

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little tightening before October, sellers believe.

Pittsburgh—High production continues with 51 of 54 district stacks operating. Blast furnace at Crucible Steel Co.'s Midland, Pa., plant and two stacks at United States Steel Co.'s Clairton Works are down for repairs. Crucible Steel does not expect its idle furnace in operation until early September. U. S. Steel's stacks should be in blast within a few weeks. Pittsburgh Coke & Chemical Corp.'s new furnace will be operating next summer. Slight easing in supply in all grades is noted this past week with curtailment of certain foundry operations in the district. Demand will increase after Labor Day as vacations end and some conversions to defense work are effected.

Drop in demand for plumbing products forced American Radiator & Standard Sanitary Corp., Pittsburgh, to close foundry operations until after Labor Day. Theodore E. Mueller, president, blamed closing on demand slowdown caused by "raw material shortages, restrictions on key building materials, tight credit terms on new home purchases and confusion created by changing price regulations." Pittsburgh plant employs about 1000.

Detroit — Campbell, Wyant & Cannon Foundry Co. has been permitted by OPS to increase its casting prices 5 to 7 per cent. According to C. L. Beatty, executive vice president, the increase has already been made effective. He said it was necessitated by increased labor and materials costs. The company is a large supplier of automotive castings.

Cincinnati — Some foundries were enabled by vacations and decreased melt to increase pig iron stocks modestly. Market interests foresee expansion of the melt as imminent.

Chicago—Demand for foundry iron is intense despite fact jobbing casting business is spotty. Shops serving machine tool industry are booked to capacity while those making automotive and general items are not crowded.

Birmingham—Even though the vacation period is winding up, little or no noticeable effect on demand for pig iron is evident in this district. A few tons are obtainable here and there but merchant iron users have not relaxed their efforts to build inventories.

Scrap . . .

Scrap Prices, Page 132

Boston—Inventories of heavy melting steel are low with no improvement in incoming volume at a time when supplies should be building up for winter. Yard receipts are limited. The ratio of bundles in shipments is above normal. Cast buying is in better balance with needs. Foundries have fair inventories and are not taking everything offered.

New York—Increasing activity at district foundries, combined with even greater stringency in pig iron, has resulted in a pick-up in demand for cast scrap. Over recent weeks there has been a little easing in the supply of this material, due to mass vacations at various plants and to the fact some foundries became fairly well stocked through the acceptance of upgraded material. Meanwhile, shortage in steel scrap continues almost as pronounced as ever although there is a little better movement of industrial material, due to the fact most metalworking plants have completed their vacations.

Buffalo—Mills and dealers are not over-optimistic about the recent improvement in scrap receipts here. They still have a long way to go to build up reserve supplies to the volume needed to assure capacity production in approaching months. Allocation orders are responsible for sizable shipments into the area from outside points. Mid and down-state receipts are heavy. A temporary lull is noted in water shipments, which have been running heavy.

Philadelphia—Scrap consumers of both steel and cast grades appear to be making some headway on inventories. The situation in steel scrap is critical at some plants but stocks are a little better than they were a couple of weeks ago. No further allocations of steel scrap have been reported, which is regarded as an encouraging sign. However, it is admitted that in some cases shipments against previous allocations have not been completed.

Pittsburgh—Scrap movement continues faster here with foundries and steel plants able to better their inventory positions slightly. Credit for greater flow goes to Scrap Salvage Committee and efforts of scrap-conscious sales personnel. Movement at present level will not allow normal winter inventories to be reached and this fact is a major concern of scrap users.

Detroit—Allocation of scrap from a few dealers' yards has begun. Scrap piles are spotty both at mills and dealers' yards. One mill is laying down open hearth scrap for winter but is unable to get ahead on blast furnace grades. No appreciable tonnage of scrap has been rooted out by the drive, traders say. Few foundries are pressing for cast.

Cincinnati — Mills are depending increasingly on allocations of scrap to sustain current high level of melt. Mill stocks of scrap are so low the situation is precarious. Collections are slower. Dealers' yard supplies are below normal. Foundries are taking all steel and good cast offered, but poorer cast is moving slowly.

Chicago—Steel mills make no headway in their effort to build scrap inventories. To sustain steelmaking at around 105 per cent of capacity melting material is consumed faster than it is taken in.

St. Louis—Movement of outside scrap to yards continues slow. Local industry's "get out the scrap" appeals so far have had little effect. Mills are concerned at the dimming prospects of building usual winter stockpiles by summer's end. Outlook is for little improvement in scrap flow. Rerolling mills are having increasing trouble getting rails. Dealers say railroads are not replacing rails in proportion to the new rails available to them.

Birmingham — Some improvement is evident in the movement of steel

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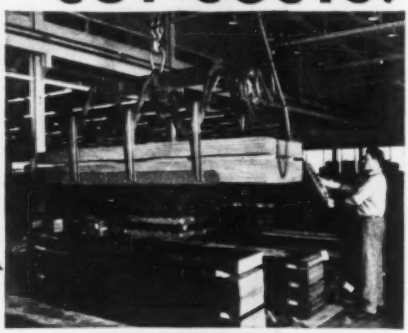

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scrap, although it is slight. Heavy melting is scarce, almost to the critical point. Demand for cast grades continues brisk.

Los Angeles—Decreased interest by foundries is imparting a weaker tone to cupola cast. Sustained by allocations to dealers, market for steelmaking scrap is strong.

Warehouse . . .

Warehouse Prices, Page 131

Philadelphia — Warehouses anticipate little change in August business from that of July. With various metalworking shops still taking time out for vacations there is not quite the pressure there was several weeks ago, but the fact remains volume is still guided largely by inventories, with demand in excess of supply.

Pittsburgh—Receipts during June, July and August were in line with NPA regulations and due to slackened demand for distributors items has allowed warehouses to slightly better their inventory position. Slackened demand is result of summer slowdown and conversions to defense work. However, greater pressure for warehouse items is anticipated after Labor Day. More complaints that base period is not representative for the industry are heard.

Cleveland — There is little chance the warehouse inventory will be materially improved over coming months. While the distributors are assured of tonnage up to 85 per cent of their receipts from the mills in the base period, the amount of "free" steel open to them in fourth quarter will be relatively small. Heretofore, this area has provided a substantial tonnage for them. Resumption of operations at manufacturing plants closed for summer vacations is resulting in rising demand pressure on the distributors. However, slackening of activities in the consumer durable goods industry is resulting in some easing of pressure from that direction.

Cincinnati — The warehouse inventory position is unimproved. Sales volume is being maintained from current mill shipments.

Birmingham—Warehouse men anticipate shipment of full quotas from mills in fourth quarter. But they do not expect any so-called free steel to speak of. As usual, movement from warehouses is limited only by availability of stocks.

Rails, Cars . . .

Track Material Prices, Page 127

New York — Leading car builders report exceeding difficulty in placing steel. Despite CMP tickets, a number of orders are being returned to them by the mills with the explanation they are already booked up on all rated tonnage and can do nothing at this time. The carriers have had for the most part acceptances for fourth quarter on the basis of 70 per cent of their third quarter tonnage which they were permitted to place early in third quarter, pending full consideration of fourth quarter needs by Washington. It is the additional tonnage which they feel they need and which Washington has certified to a considerable extent that is causing them difficulty at this time. Un-

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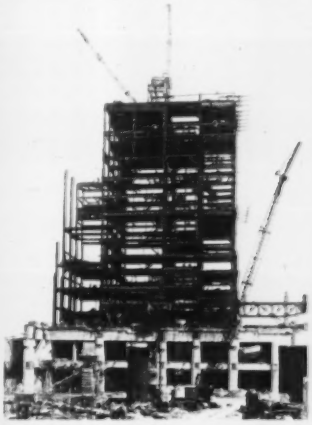

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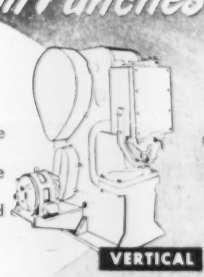

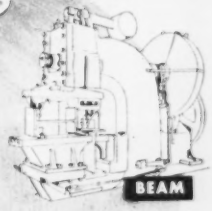

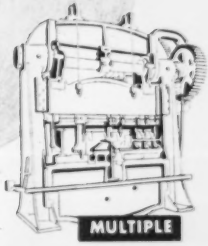

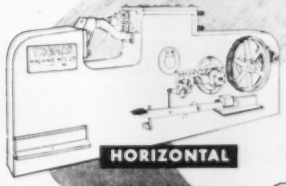

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PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

less adequate relief is given, some car shops claim they will not be able to operate at all in the closing month or so this year.

In an outline of plans for the purchase of railroad equipment in the 1952 fiscal year before the House Appropriations Committee, the Transportation Corps has listed 426 diesel-electric locomotives, 2312 box cars, 878 flat cars, 100 refrigerator cars, 648 tank cars, 1208 open cars, 254 inspection and maintenance cars and 147 special cars. Estimated cost is $115,267,685.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1000 tons, oil refinery, Sarnia, Ont., through M. W. Kellogg & Co., New York, to Belmont Iron Works, Eddystone, Pa.

500 tons, power plant, Central Electric Power Co., Chamois, Mo., to Reynolds Mfg. Co., Springfield, Mo.

200 tons, grade separation structure, New Haven-East Haven, Conn., to Truscon Steel Co., New York, through Mariani Construction Co., New Haven, general contractor.

250 tons, Howard street bridge, Evanston, Ill., to American Bridge Co., Pittsburgh; Thomas McQueen Co., Forest Park, Ill., contractor.

214 tons, 25th avenue grade separation, Maywood, Ill., to American Bridge Co., Pittsburgh; Thomas McQueen Co., Forest Park, Ill., contractor.

190 tons, First avenue grade separation, Maywood, Ill., to American Bridge Co., Pittsburgh; Thomas McQueen Co., Forest Park, Ill., contractor.

274 tons, grade separation structure and approaches, New Haven-East Haven, Conn., to American Bridge Co., Pittsburgh, through Mariani Construction Co., New Haven, general contractor.

170 tons, four-span plate girder bridge, Windsor, Conn., to Truscon Steel Co., New York, through Brunalli Construction Co., Southington, Conn., general contractor.

STRUCTURAL STEEL PENDING

1736 tons, state bridge work, Union county, New Jersey; bids Aug. 30.

500 tons, bridge, project FM-887, Cedar Rapids, Iowa; bids Aug. 7.

150 tons, senior high school, New Cumberland, Pa.; bids asked.

100 tons, state bridge work, Dutchess and Columbia counties, New York; bids closed Aug. 15.

270 tons, bridge, section 1F-2, Cook county, Illinois; Bethlehem Steel Co., low on bids Aug. 7.

250 tons, courthouse, Camden, N. J.; bids closed Aug. 16.

170 tons, state bridge work, Berks county, Pennsylvania; bids Aug. 31.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2500 tons, jet engine plant, Buick Motor Division, General Motors Corp., Willow Springs, Ill., to Ceco Steel Products Corp., Cicero, Ill.; Thorgersen & Ericksen Co., Chicago, contractors.

600 tons, personnel division, Lt. Norman Beatty Memorial hospital, Westville, Ind., to Joseph T. Ryerson & Son Inc., Chicago; Joseph J. Duffy Co., Chicago, contractor.

250 tons, boiler house, St. Anthony hospital, Rock Island, Ill., to Joseph T. Ryerson & Son Inc., Chicago; Priester Construction Co., Davenport, Iowa, contractor.

252 tons, administration buildings and dormitories, Chanute Field, Rantoul, Ill., to Ceco Steel Products Corp., Cicero, Ill.; Jonathan Woodner Co., Chicago, contractor.

200 tons, Fisher dormitory, University of Notre Dame, South Bend, Ind., to Olney J. Dean Steel Co., Chicago; Peter Schumacher & Sons, Mishawaka, Ind., contractor.

147 tons, waterworks improvement, Evergreen Park, Ill., to Truscon Steel Co., Youngstown, O.; Northern States Co., Chicago, contractor.

REINFORCING BARS PENDING

254 tons, state bridge, Union county, New Jersey; bids Aug. 30.

PLATES . . .

PLATES PLACED

Unstated, 30 deck scows and 10 covered barges, Delaware, Lackawanna & Western, to Staten Island, N. Y., yard, Bethlehem Steel Co.

Unstated, four 110-foot tug boats, Baltimore & Ohio, to RTC Shipbuilding Corp., Camden, N. J.

Unstated, four 110-foot tugs, Central of New Jersey, to RTC Shipbuilding Corp., Camden, N. J.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Missouri Pacific, 126 diesel-electric locomotive units, including: eighteen 2250 hp passenger units and fifty-five 1500 hp road switching units to Electro-Motive Division, General Motors Corp., La Grange, Ill.; forty "A" and "B" freight units, each of 1500 hp, to American Locomotive Co., New York; thirteen 1000 hp switching units to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

RAILROAD CARS PLACED

Canadian National, 350 fifty-ton box cars and 250 seventy-ton triple hopper cars, to American Car & Foundry Co., New York; equipment is for use on American lines of the Grand Trunk Western Railroad, a subsidiary.

RAILROAD CARS PENDING

Union Pacific and the Chicago & Northwestern, 23 passenger cars reported contemplated for purchase for use in joint services.

Western Pacific, 300 seventy-ton drop bottom gondolas and 100 fifty-ton hopper ballast cars; bids asked.

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Reactivates Foundry in East

Castalloy Co. Inc., Cambridge, Mass., reactivated its magnesium and heat-treated aluminum foundry facilities. It is producing high-quality aircraft and ordnance castings in which it specialized during World War II. Fred Hengesch is president of Castalloy which has its plant at 20 Beacham St., Everett, Mass.

Simonds Moves Branch Office

Simonds Saw & Steel Co., Fitchburg, Mass., and Simonds Abrasive Co., Philadelphia, moved their combined branch office, shop and warehouse from 127 S. Green St. to 3323 W. Addison St., Chicago.

Enlarges Stampings Plant

Stoner Mfg. Co., Aurora, Ill., plans erection of a 30,000 square foot sheet metal stampings plant addition to cost $350,000.

Oakley Steel Plans To Build

Oakley Steel Products Co., Bellwood, Ill., has taken bids on construction of a factory building to cost about $150,000.

Plans $2.3 Million Refinery

Kanotex Refining Co., Arkansas City, Kans., plans construction in that city of a refinery to cost upwards of $2.3 million.

Globe Steel Appoints Agent

Globe Steel Tubes Co., Milwaukee, appointed Smith Pipe & Steel Co., Phoenix, Ariz., as distributor of its tubing products and welding fittings in that area.

Niagara Machine & Tool

Niagara Machine & Tool Works, Buffalo, moved its Detroit offices to new and larger quarters at 15481 James Couzens highway. The company makes presses, shears and other sheet metal working machines. Russell J. Caplin is Detroit branch manager.

Reeves Pulley Co. Expands

Expansion of its West Coast facilities to include a new factory, warehouse and assembly unit in San Francisco and a new warehouse serving the Los Angeles area is announced by Reeves Pulley Co., Columbus, Ind. The company also has opened sales and engineering offices in San Francisco and Los Angeles. Robert G. Sullivan is manager of the company's operations on the West Coast with headquarters in San Francisco. The company manufactures variable speed drives.

Heli-Coil Operates Plant

Heli-Coil Corp. is now producing thread inserts in its new plant at Danbury, Conn., having moved from Long Island City, N. Y.

Iron Fireman To Expand

Iron Fireman Mfg. Co., Cleveland, plans a $100,000 expansion and improvement program at its Portland, Oreg., plant. The project involves alterations and purchase of some new machinery.

Cleco Appoints Distributors

Cleco Division, Reed Roller Bit Co., Houston, appointed Highway Machinery & Supply Co. Inc., Richmond, Va., Sterling Sales Inc., Worcester, Mass., and Wallner Welding Supply Co., Duluth, as distributors for Cleco products in their areas. Cleco manufactures air tools and accessories.

Brainard Opens Warehouse

Brainard Steel Co., Warren, O., established new warehouse facilities in San Francisco and opened a sales office there with Harry W. Hughes in charge as West Coast manager.

Will Enlarge Dallas Plant

Diamond Alkali Co., Cleveland, will expand its silicate of soda plant at Dallas. The project, estimated to cost several hundred thousand dollars, calls for installation of a large furnace to supplement the production of three smaller-type furnaces now in operation. The present furnace building will be remodeled to accommodate the expanded facilities.

Ceilcote Co. Moves

Ceilcote Co., specialists in corrosion-proof construction, moved its offices to 4832 Ridge Rd., Cleveland 9.

Laboratory Furniture Moves

Laboratory Furniture Co. Inc., manufacturer of steel laboratory furniture, opened its new plant on Old Country road, Mineola, Long Island, N. Y.

Plans $40 Million Pulp Mill

Ketchikan Pulp & Paper Co., Bellingham, Wash., will build a $40 million pulp mill at Ward Cove, near Ketchikan, Alaska. The company was organized three years ago by Puget Sound Pulp & Timber Co., operating a large plant in Bellingham,

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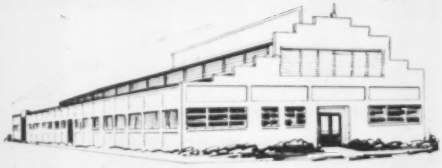

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and American Viscose Corp., Philadelphia. An agreement with government officials provides that the plant must be in operation by Aug. 2, 1954. Under the certificate of necessity, the company is entitled to priorities for steel and other necessary materials.

Acme Moves to New Plant

Acme Mfg. Co. moved into its new plant at 1400 E. Nine Mile Rd., Detroit. The company has increased facilities for experimental, engineering and production work. The company makes automatic polishing and buffing machines.

Goodrich Builds in Kentucky

B. F. Goodrich Chemical Co., a division of B. F. Goodrich Co., Akron, will construct a chemical plant in Calvert City, Ky., at an estimated cost of $5 million. The project is expected to be in operation late in 1952 or early 1953.

Carboloy Names Distributor

General Electric Co.'s Carboloy Department, Detroit, appointed Tools & Abrasives Inc., Fort Wayne, Ind., as its distributor in that area. Carboloy standard tools and blanks, carbide-tipped masonry drills and diamond impregnated carbide wheel dressers will be carried in stock. C. E. Weisenauer is president of Tools & Abrasives.

Groov-Pin Corp. Moves

Groov-Pin Corp., formerly of Union City, N. J., will move into its new plant and general offices at 1119-1133 Hendricks Causeway, Ridgefield, N. J., on Aug. 20. The plant includes separate facilities for manufacturing a new self-tapping threaded bushing, designed as a foundation for tapped threads in aluminum, magnesium, plastics and other softer-than-steel materials. The company's regular line consists of grooved pin press fit fasteners.

RCA Builds Hollywood Plant

Radio Corp. of America, RCA Victor Division, 1560 North Vine St., Hollywood, Calif., is constructing a 70,000 square foot factory building at 11801 West Olympic Blvd., to manufacture electronic equipment.

Applied Research Expands

Applied Research Laboratories, manufacturer of spectrochemical equipment, is occupying a new plant at 3630 San Fernando Rd., Glendale, Calif. The plant houses the company's Quantometer Instrument Division and is for exclusive manufacture of quantometers and source units for production control and industrial research. A new building for the general offices and development divisions is under construction in Montrose, Calif.

Federal Scrap Metals Co.

A business name has been filed in the Erie, Pa., county clerk's office for the Federal Scrap Metals Co., 414 Colvin Ave., Buffalo, by Morris R. Silverstein and Max Schrutt.

Helipot Corp. Expands

Helipot Corp., South Pasadena, Calif., an affiliate of Beckman Instruments Inc., leased additional space on Colorado street, Pasadena, for expansion of its manufacturing facilities. Helipot manufactures high-precision, wire-bound potentiometers, used in the assembling of many types of electronic equipment.

Aircraft Parts Firm Moves

Allen Scott Co. Inc., manufacturer and repairer of aircraft parts, moved into a new plant in the Los Angeles International Airport Industrial tract. Land, building and equipment represent an investment of $125,000.

Builds Guided Missile Plant

Consolidated Vultee Aircraft Corp., San Diego, Calif., is building a guided missile plant in Pomona, Calif. Several thousand persons will be employed at this plant, the first integrated mass production facility for guided missiles in this country.

Tempil Appoints Agent

Tempil Corp., New York, added Southern Oxygen Co. Inc., Washington, as a distributor of its line of temperature indicating materials. These materials are used in heat-dependent manufacturing operations where accurate temperature control is of importance, as in preheating for welding, heat treating, forging, hardening, tempering and casting. They will be stocked at Southern Oxygen's 14 district offices.

To Reopen Ordnance Works

Chemical Plants Division, Blaw-Knox Construction Co., Pittsburgh, was awarded a contract by U. S. Rubber Co., New York, for construction services in reactivating the Kankakee Ordnance Works, Joliet, Ill.

Buys Stevens Level Co.

Columbian Vise & Mfg. Co., Cleveland, purchased E. A. Stevens Level Co., Newton Falls, O. Both of these companies are manufacturers in the hardware

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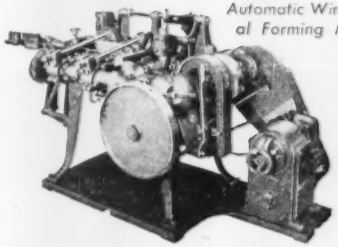

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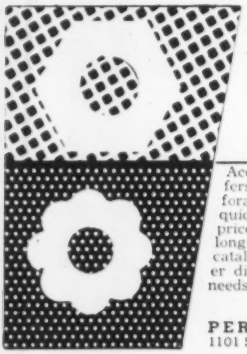

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and mill supply fields. Plans are being made for immediate substantial expansion in manufacturing facilities of the Newton Falls plant, to be operated as the Stevens Level Division of Columbian Vise & Mfg. Co. E. A. Stevens is plant manager.

Plans $38 Million Plant

National Petrol-Chemical Corp., formed by Panhandle Eastern Pipeline Co. and National Distillers Products Co., New York, contemplates the erection in Tuscola, Ill., of a plant to extract butane, propane, ethyl, etc., from piped natural gas. The plant with equipment would cost about $38 million.

Builds Steel Gear Factory

Janette Mfg. Co., Chicago, awarded a contract for construction of a 90,000 square foot steel gear factory and office building to J. Emik Anderson & Son, that city.

Prat-Daniel Corp. Moves

Prat-Daniel Corp. moved its plant and offices to South Norwalk, Conn., from West Port Chester, Conn. The company makes space heaters, stacks, dust collectors, induced draft fans and similar power plant equipment.

Clary Multiplier Expands

Clary Multiplier Corp., San Gabriel, Calif., manufacturer of adding machines and calculating machines, is constructing a 15,000 square foot addition to its plant in that city. Facilities were also expanded at its Los Angeles plant.

Consolidates Branch Offices

American Cyanamid Co., New York, consolidated its several office and warehouse locations in Chicago and St. Louis into one newly constructed building in each city. This is part of an overall company plan which calls for other consolidations in major cities of the United States and Canada.

Forms Speedmilling Co.

Speedmilling Co., 777 South Arroyo Parkway, Pasadena, Calif., was formed to do milling of aluminum and magnesium billets and extrusions. J. P. Atkinson and F. W. Copeland are owners.

Universal Metal Products

Universal Metal Products Inc. moved into its new plant in Wickliffe, O., on the eastern outskirts of Cleveland. The company was formed in 1946 by Thomas O. Dahlstrand, formerly an engineer with Tinnerman Products Inc., Cleveland. The company manufactures flat springs, wire forms, stampings, spring fasteners, split tube spacers and small assemblies.

Fleet Mfg. Co. To Retool

Fleet Mfg. Co., Fort Erie, Ont., organized a giant retooling program to cope with an initial defense order worth $7 million and the prospect of additional orders. The company, now employing 200 in the Fort Erie plant, is expected to raise employment to about 2000.

Watson-Stillman Agent

Watson-Stillman Co., Roselle, N. J., manufacturer and designer of hydraulic machinery, appointed Don W. Patterson Co., Buffalo, as its representative in western New York state.

Solvay Builds Pilot Plant

New $350,000 pilot plant facilities have been completed in Hopewell, Va., for Solvay Process Division, Allied Chemical & Dye Corp., New York, by H. K. Ferguson Co., Cleveland.

P & K Automotive Moves

P & K Automotive moved from Rosemead, Calif., to 4938 Encinita, Temple City, Calif. Speed equipment and aircraft parts are manufactured.

Johnson-Williams Expands

Johnson-Williams Ltd., manufacturer of combustible gas indicators and alarms for industrial and marine application, doubled production space at its Palo Alto, Calif., plant. New facilities will be devoted to laboratory and machine-shop operations.

Forms U. S. Accessory Corp.

U. S. Accessory Corp., 5255 West 102nd St., Los Angeles, subsidiary of Industrial Associates Inc., was organized to overhaul aircraft accessories.

Brunner In New Laboratory

Brunner Mfg. Co., Utica, N. Y., completed a $100,000 laboratory in that city. It has 3,600 square feet of floor space and is located in a building near the main office.

Dow Sells Stocks in Thiokol

Dow Chemical Co., Midland, Mich., sold its 20 per cent interest in Thiokol Corp., Trenton, N. J., to a group of eastern investors. The latter company manufactures a synthetic rubber used in special industrial and military applications.

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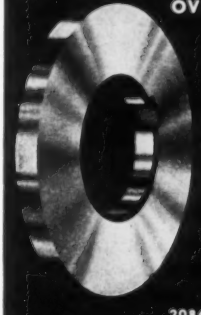

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Sellers #4T Tool Grinder, with motor, fully universal
Sellers #6T Tool Grinder, NEW 1941
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Landis 26" x 144" External Grinder, complete tooling
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Norton 10 x 24 Plain Grinder
Micro Internal Grinder Model F.G.
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American 24" x 10' Lathe, 3 step cone drive, double back geared, 1⅞" hole thru spindle
American 30" x 32' Geared Head Lathe, 12 speed, 2⅞" hole thru spindle, 26' centers
American 48" x 20' Geared Head Lathe, 16 speed, 2⅝" hole thru spindle, first class
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Ingersoll 42 x 36 x 12 Miller, 4 head adjustable rail
Milwaukee #3B Universal Miller, double overarm, power feed in all directions, working surface 55" x 15"
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Gray 24 x 24 x 6' Planer, countershaft drive, 1 head on rail
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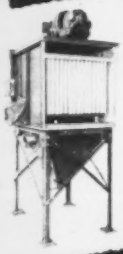

Unit Dust Collector stops dust at source, minimizes machine wear and tear, reduces housekeeping and maintenance costs. Solves many grinding and polishing nuisances. Models from $286.00 and up.

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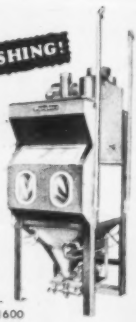

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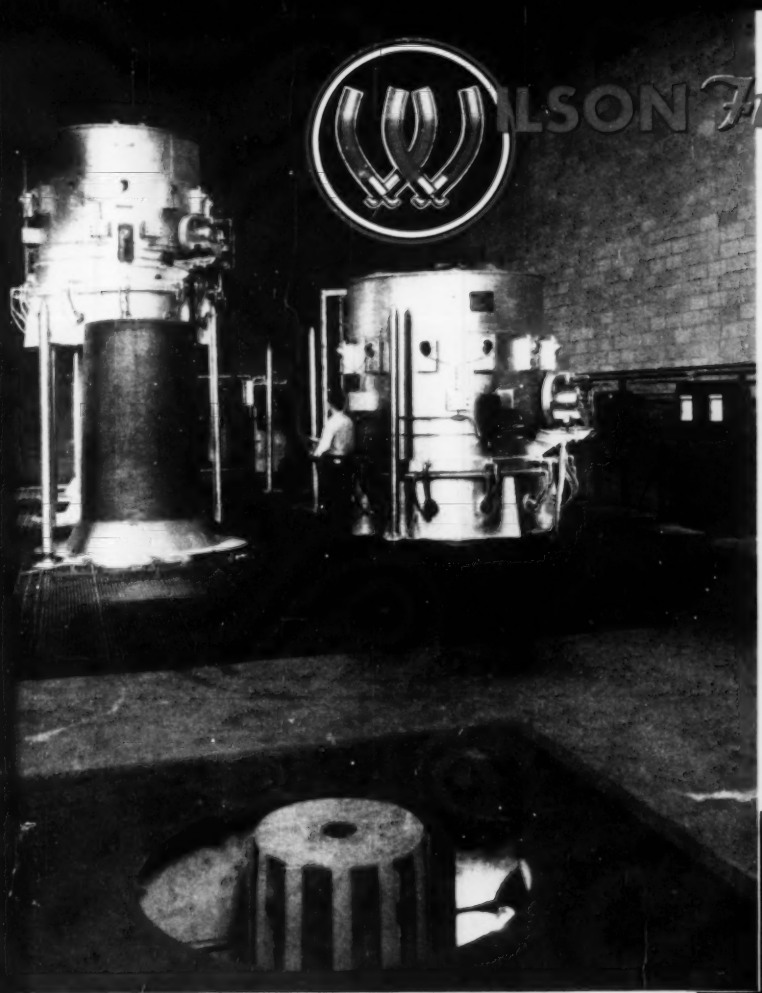
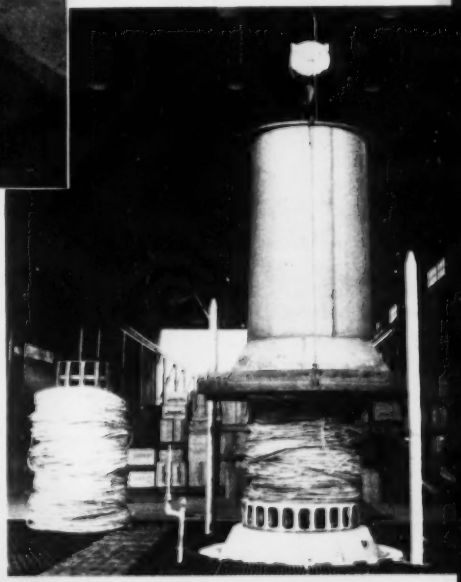


WILSON *Furnaces* for ROD AND WIRE COIL SPHEROIDIZING



Wilson Furnaces like these are in use at such plants as Lamson & Sessions Co., National Screw & Mfg. Co., and 3 plants of Russell, Burdsall, & Ward Bolt & Nut Co., for converting available rod sizes and analyses to useable sizes and physical properties for vital cold heading operations. There are other installations and most are equipped with atmosphere generating equipment to control decarburization.

Lee Wilson **ENGINEERING** *Co., Inc.*

20005 WEST LAKE ROAD • CLEVELAND, OHIO
Telephone ED-1-6600

BELL TYPE FURNACES ★ RADIANT TUBE HEATING ★ ANNEALING PROCESSES

How to keep a stand from lying down on the job

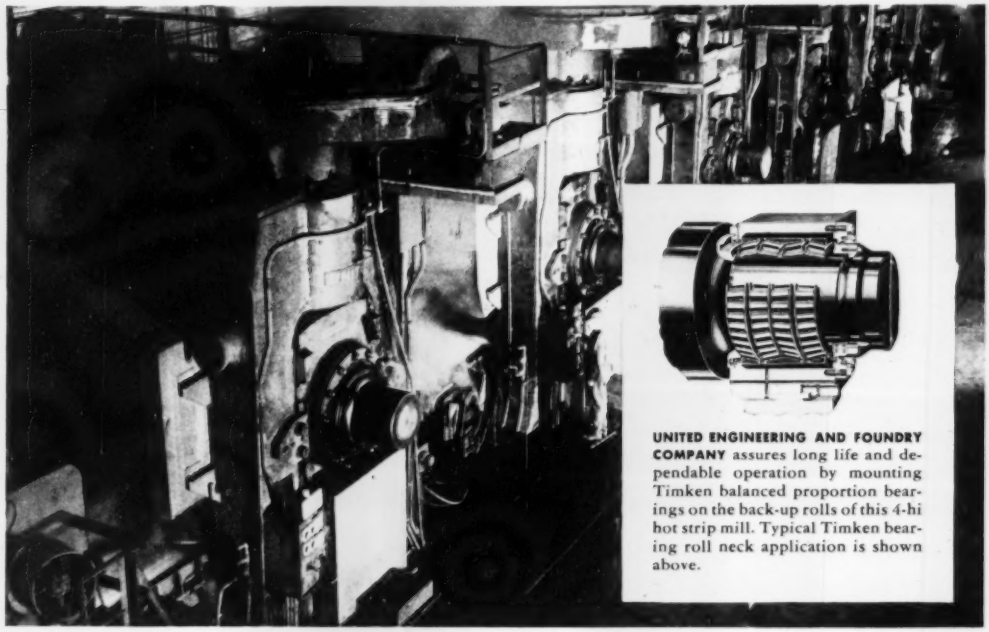
THESE six stands, built by the United Engineering and Foundry Company, are at the finishing end of a 4-hi hot strip mill. And to keep them on the job with minimum time-out for maintenance and repairs, Timken® bearings were specified for the work rolls and back-up rolls.

Timken bearings eliminate complicated lubrication systems, permit the use of simple and economical grease lubrication. Rolls can be changed quickly and easily. No special thrust bearings are needed because Timken bearings take radial and thrust loads in any combination. Since Timken bearings minimize roll neck friction, higher rolling mill speeds are possible. And mills can be stopped and restarted without loss of steel.

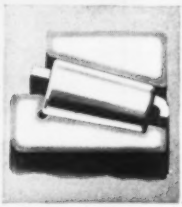
Because Timken bearings of balanced proportion design are on the back-up rolls, the stands get greater mill rigidity, have larger diameter roll necks. With Timken balanced proportion bearings, load ratings are increased up to 40%, roll neck strength upped 50 to 60%.

Backed by over fifty years of bearing research and development, Timken bearings are first choice throughout industry. Be sure to specify them for roll necks on both new and existing equipment. For full information consult our roll neck bearing specialists. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



UNITED ENGINEERING AND FOUNDRY COMPANY assures long life and dependable operation by mounting Timken balanced proportion bearings on the back-up rolls of this 4-hi hot strip mill. Typical Timken bearing roll neck application is shown above.



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL AND THRUST ○ LOADS OR ANY COMBINATION